SANTA CLARA VALLEY WATER DISTRICT

INSTREAM WETLAND VEGETATION REGROWTH STUDY

FOURTH ANNUAL REPORT: RESULTS FOR 2001

Prepared in Accordance With

The California Regional Water Quality Control Board
San Francisco Bay Region
Order 98-088

Prepared by

Gale Rankin
Botanist
Ecological Services Unit

and

Janell Hillman
Botanist
Ecological Services Unit

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95210

Don Arnold
Unit Supervisor
Ecological Services Unit

James Fiedler
Deputy Chief Operating Officer
Watershed Management Division

TC
537
R36
v.2001
c.1
LIBRARY

TC 537 R362 2001 c.1

SANTA CLARA VALLEY WATER DISTRICT
LIBRARY
5750 ALMADEN EXPRESSWAY
SAN JOSE, CALIFORNIA 95118

TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY 1

INTRODUCTION 3
    BACKGROUND AND PURPOSE 3
    STUDY OVERVIEW 4

METHODS 6
    STUDY SITES 6
    SITE ASSESSMENTS 13

RESULTS 19
    EXCAVATION SITES 19
    REFERENCE SITES 22
    GENERAL REFERENCE SITES 22

DISCUSSION 28
    SUMMARY FINDINGS 28
    COMPARISON OF 1998 EXCAVATION AND REFERENCE SITES 40
    VEGETATION MANAGEMENT 42
    STUDY GOALS AND OBJECTIVES AND SUMMARY RESULTS 42

REFERENCES 44

TABLES

TABLE 1
    Excavation Sites 11
TABLE 2
    Adjacent Reference Sites 12
TABLE 3
    General Reference Sites 13
TABLE 4
    Vegetation Dominance Types 15
TABLE 5
    Vegetation Quality Indicators 15
TABLE 6
    1998 Project Excavation Sites: Summary of Third Year (2001) Post-Project Assessments 20
TABLE 7
    1998 Project Excavation Sites: 1998 (Preproject) Through 2001 (Third year Postproject) Comparisons 21
TABLE 8
    Adjacent Reference Sites: Summary of 2001 Assessments 23

TABLE 9
1998 Project Adjacent Reference Site Comparisons: 1998-2001 24
TABLE 10
General Reference Sites: Summary of 2001 Assessments 25
TABLE 11
General Reference Sites: Comparisons 1997-2001 27
TABLE 12
Summary of 1997-01 Wetland Vegetation Regrowth Acreage Results 24

FIGURES

FIGURE 1
Study Site Locations: North County 9
FIGURE 2
Study Site Locations: South County 10
FIGURE 3
Wetland Regrowth Through 2001 in Tidal and Nontidal Creeks After Sediment Excavation in 1998 28
FIGURE 4
Vegetation Dominance Through 2001 in Tidal and Nontidal Sites After Sediment Removal in 1998 31
FIGURE 5
Berryessa Creek u/s Lower Penitencia Creek 32
FIGURE 6
Berryessa Creek Hillview to Calaveras 33
FIGURE 7
Wetland Acreage Through 2001 on 1998 Adjacent Reference Sites in Tidal and Nontidal Creeks 34
FIGURE 8
Vegetation Dominance Through 2001 in Tidal and Nontidal Reference Creeks . . . 35
FIGURE 9
Wetland Acreage Through 2001 on Nontidal General Reference Sites 36
FIGURE 10
Wetland Acreage Through 2001 on Tidal General Reference Sites 36
FIGURE 11
Vegetation Dominance Through 2001 in Nontidal General Reference Sites 37
FIGURE 12
Vegetation Dominance Through 2001 in Tidal General Reference Sites 38
FIGURE 13
Guadalupe River General Reference Site: Aerial View u/s Tasman Drive, 2000 and 2001 39

Page

APPENDICES

APPENDIX A
    Study Plant List
APPENDIX B
    1998 Excavation Site Checklists
APPENDIX C
    1998 Adjacent Reference Site Checklists
APPENDIX D
    General Reference Site Checklists
APPENDIX E
    1998 Excavation and Adjacent Reference Site Photographs

APPENDIX F
    General Reference Site Photographs
APPENDIX G
    Recent Excavation History of Study Sites
APPENDIX H
    Routine Vegetation Management on Study Sites

EXECUTIVE SUMMARY

This is the fourth and final in a series of four annual reports for the Santa Clara Valley Water District's (District) Instream Wetland Vegetation Regrowth Study (Study). This report has been prepared in accordance with California Regional Water Quality Control Board, San Francisco Bay Region (Board) Order 98-088.

The purpose of the Study is to better define the nature of wetland impacts resulting from the District's sediment removal projects in earthen flood control channels by studying vegetation reestablishment after excavation. The Study documents vegetation reestablishment on portions of 12 tidal and nontidal 1997 and 1998 sediment removal project sites (Excavation Sites), and monitors the wetland vegetation on other sites (Reference Sites) not currently subject to sediment removal. The Study assesses the amount and characteristics (vegetation dominance and quality) of wetland vegetation during the peak of the growing season prior to project implementation and for the next 3 years thereafter. Year 2000 was the third, and final year, of assessments for the 1997 Excavation Sites, while 2001 represents the third year for the 1998 Excavation Sites. Therefore, this fourth year report presents results of the final year of postproject assessments for the 1998 Excavation Sites and Reference Sites.

Results indicate that total nontidal wetland amounts approached or surpassed preexcavation amounts within 1 to 2 years after excavation on both 1997 and 1998 sites. Overall tidal regrowth was rapid on 1998 sites, with as much wetland vegetation present within 2 years after excavation as before excavation. On 1997 sites, however, total tidal regrowth remained lower than the preexcavation amount. The substantial regrowth amounts on the Excavation Study Sites indicates that instream wetlands can and do reestablish after sediment removal activities, but that regrowth on certain tidal sites can be substantially slower compared to other tidal sites and to all nontidal sites.

The third and final year evaluation of the 1997 Excavation Sites indicated substantial overall regrowth (97%) since excavation. With total nontidal regrowth at 124% and tidal regrowth at 64%, vegetation on many sites equaled or exceeded preproject amounts by the end of the study period (2000). Results of the third and final postproject year evaluation of the 1998 Excavation Sites indicate an even faster rate of total regrowth and greater regrowth amounts than on the 1997 Sites, since total nontidal and tidal regrowth surpassed excavation within two years post-project. By 2001, the 1998 Sites exhibited a total regrowth of 149%, nontidal regrowth of 178%, and tidal regrowth of 128%. All individual 1998 sites had regrowth of more than 100% by 2001 except the tidal Sunnyvale East (24%).

Vegetation amounts did not increase in nontidal areas from 2000 to 2001 and may even have decreased slightly. This reversed a prior trend of increasing wetland in the first two postproject years. The decreases in the Excavation Sites are so small that sampling error might come into play. In contrast, total tidal wetland vegetation increased on all sites in all years except on the tidal General Reference Sites, where results were heavily influenced by vegetation management practices on the large Guadalupe River site.

Over the entire study period, total vegetation amounts on tidal 1998 Adjacent Reference sites have increased each year, resulting in current (2001) amounts exceeding the baseline amounts. Although the nontidal sites' vegetation doubled in acreage from 1998 to 2001, the largest increase came in 1999, after which growth leveled off and then exhibited a slight decrease in 2001. On General reference sites, vegetation declined in 1999 on tidal and nontidal sites and again in 2001 on nontidal sites. In 2000 and in 2001, total vegetation amounts were lower than the baseline amount on nontidal sites and higher than the baseline amount on tidal sites.

Vegetation dominance and quality (as represented by vegetation type, total percent cover of vegetation, and relative percent cover of native and invasive species) had similarities between years on both Excavation and Reference Sites. However, most sites did experience some changes over the course of the study in either dominance or quality. Most changes were either neutral or positive (e.g., full or partial transition from one native-dominated vegetation type to another; disappearance of a nonnative vegetation type; increased total percent cover). Potentially negative changes (e.g., increased invasive species cover; appearance or increase in amount of a nonnative vegetation type; decrease in total percent cover) were fewer. This type of change was most notable on a 1998 Excavation Site (Berryessa Creek), where the increase in nonnative vegetation also corresponded with an increase in wetland amount.

For the most part, there was no clear differentiation in the tendency for changes in vegetation dominance or quality to occur in Excavation Sites as compared to Reference Sites. An exception is the overall reduction in Cattail amounts on nontidal sites immediately following excavation, with a subsequent increase in Cattail amount over time. Although it was not a purpose of this Study to examine the effects of the District's vegetation management program on vegetation composition, we have seen indications of dominance shifts in vegetation from one type to another that may have resulted from this program.

Two General Reference Sites and a 1998 Excavation Site were disturbed by sediment removal projects conducted after 2000 field surveys. Two of these sites (San Francisquito Creek downstream [d/s] Highway 101 and Stevens Creek) were subsequently removed from the study in 2001. The third site, Sunnyvale East Channel, was assessed prior to sediment removal work in the impacted reach and at its normal assessment period for the section that was not impacted (see 2001 Sampling Update, Methods Section).

INTRODUCTION

BACKGROUND AND PURPOSE

The District maintains channelized streams (flood control channels) in Santa Clara County to ensure that they have a continuing functional life and provide the level of flood protection originally designed. Sediment removal, which removes both accumulated sediment and associated vegetation that reduces the ability of the channels to carry design flows, is a major component of the maintenance program and is the maintenance activity that most affects wetland resources in channels under District jurisdiction.

The purpose of the Study is to better define impacts to instream tidal and nontidal wetlands resulting from the District's sediment removal projects in flood control channels by increasing our understanding of the process of vegetation reestablishment after excavation. The major extent of instream wetlands in Santa Clara County occurs in flood control channels because there is little or no overstory to shade out wetland plants, and the relatively wide, level channel beds result in more wetted surface area. Channels with these types of features are also where the majority of sediment removal activity occurs and are the primary focus of this study.

The objectives of the Study are to determine the rate, extent, and vegetation characteristics of wetland vegetation reestablishment after sediment removal. The Study documents reestablishment characteristics on portions of selected 1997 and 1998 sediment removal project sites (Excavation Sites) and also monitors the status of wetlands on study sites not currently subject to sediment removal (Reference Sites). Provisions of the study called for 3 years of postproject surveys. After 3 years, the need for further study was to be reassessed based on current needs and Study results. Year 2000 represented the third year of postproject surveys for the 1997 sites, while year 2001 represented the third year of surveys for the 1998 sites. Therefore, this report contains the third, and final year's assessment of 1998 sites, as well as an evaluation of both the 1997 and 1998 sites in regard to the overall objectives of the Study.

The Study was designed to assess wetland regrowth at Excavation Sites during each of the 3 years following excavation. Therefore, wetlands were assessed during the time of year when growth is expected to be at or near its peak (generally August through October in perennial and tidal streams, and early summer for intermittent streams). The Study incorporates information acquired from other studies conducted between 1995 and 1997, as well as information acquired specifically for the Study (see Rankin and Hillman 1998). This allows us to take advantage of an expanded range of applicable information obtained since sediment removal work first recommenced in 1997 after a several year interruption.

Clearly, wetland vegetation does reestablish in flood control channels previously cleared of sediment and vegetation due to facility construction and maintenance activities. However, prior to this Study, no comparative data on preproject and postproject wetland vegetation extent or characteristics were available. The Study represents a continuing evolution in our understanding of instream wetlands, District operations and maintenance, and long-term sampling procedures. This report describes the scope of the Study and presents the findings of the 2001 surveys as well as an evaluation of the findings of all years in comparison to study goals and objectives.

STUDY OVERVIEW

The Study involves field assessments of the extent and vegetation characteristics of instream wetlands in areas affected by the District's sediment removal activities.

- **Survey Content**: Surveys, conducted annually, to determine the extent of jurisdictional wetlands present, qualitatively characterize vegetation features, and photodocument site appearance.
- **Excavation Sites**: Selected 1997 and 1998 sediment removal project sites were studied. The amount of wetland present on each site was determined prior to the start of each project. Preproject assessments of Excavation Sites served as a baseline for regrowth comparisons. Results of postexcavation surveys conducted annually for up to 3 years following the project are compared to the baseline to determine recovery extent and characteristics.
- **Reference Sites**: Reference Sites are study sites that have not been impacted by sediment removal for at least 5 years. Reference Sites are located either near Excavation Sites (Adjacent Reference Sites) or at other locations within the District's projected long-term sediment removal work area (General Reference Sites). Reference Sites were surveyed annually (unless impacted by sediment removal during the course of the study) and provide background information on instream wetlands dynamics independent of sediment removal disturbance.
- **Report of Findings**: Wetland quantity and vegetation characteristics for each site are reported annually. Current year site conditions were compared with conditions of past years. Any trends in quantity and vegetation characteristics in project and reference sites are discussed.

This is the fourth, and final in a series of four annual reports to be submitted for this Study. Included in this report are:

- Third year postproject assessments (2001) for the 1998 project Excavation Sites
- 2001 assessments for all 1998 Adjacent Reference Sites
- 2001 assessments for all General Reference Sites
- Final evaluation of third year postproject sites.

The following were included in the first, second and third annual reports (Rankin and Hillman 1999, 2000, 2001):

- Preproject, first, second, and third year postproject assessments for the 1997 project Excavation Sites
- Preproject, first, and second year postproject assessments for the 1998 project Excavation Sites

- 1998 through 2000 assessments for all Adjacent Reference Sites, and prior year assessments for some sites

- 1997 through 2000 assessments for all nontidal and one tidal General Reference Site, and 1998 through 2000 assessments for all other tidal General Reference Sites

METHODS

Information for this Study was gathered from a variety of sources including studies conducted to assess instream wetlands on other District projects and from assessments conducted specifically for this study. Sources include Thomas Reid Associate (1995), H.T. Harvey and Associate (1997), individual maintenance project assessments conducted by District biologists and Ms. Kathy Lyons of Biotic Resources Group in 1997 and 1998, and surveys conducted by District biologists in 1997 to estimate the amount of wetlands in the District's proposed long-term maintenance program work area (see Rankin and Hillman 1999 for prior results and methods). Nineteen ninety-eight through 2001 surveys were conducted specifically for the Study using the standard protocol described below.

STUDY SITES

The three types of study sites, Excavation, Adjacent Reference, and General Reference, are described below.

Excavation Sites

There are 12 Excavation Sites (Table 1, Figures 1 and 2) located on 4 of 5 1998 and 9 of 11 1997 earthen channel Sediment Removal Project sites (Note: Reported as 13 study sites in Rankin and Hillman 1999 because Berryessa u/s Lower Penitencia was excavated in both 1997 and 1998 [TRA 1995, TRA 1997, SCVWD 1998]). Nine of the Excavation Sites include the entire length of the corresponding Sediment Removal Project Site. These sites were studied in whole, because either the Sediment Removal Site was not very large or transitions in project or vegetation features were likely to occur on the site.

Three Excavation Sites, Lower Penitencia Creek, Saratoga Creek, and Sunnyvale East, consist of a portion (approximately 64%, 61%, and 67%, respectively) of each corresponding Sediment Removal Site. The features of the channel, project, and preproject vegetation on Saratoga and Lower Penitencia were homogeneous throughout each site. Therefore, subsampling the project area was sufficient to adequately assess features of the original project site, and the amount of each project area that could be captured on one aerial photograph was selected for study. Aerial photographs were taken and the study was planned to include the d/s reach of the Sunnyvale East sediment removal project; however, this segment was dropped from the project late in the planning process. Instead, the u/s segment of the remaining length of project site, Highway 237 to Carribean Drive, was selected for study (the small remaining segment d/s of this supported little wetland). In future study years, subsampling of other lengthy Study Sites may be instituted if interim study results indicate that there is little variability in amount or features of the recovering wetlands along the site length.

The Excavation Sites were defined the following way for projects on tidal sites, where sediment removal only affects one side of the channel. The Berryessa Creek u/s of

Lower Penitencia and San Tomas Aquino u/s of Highway 237 Excavation Sites include the entire channel within the study reach. The Lower Penitencia Excavation Site includes the entire west channel (the east channel is the Adjacent Reference Site). San Tomas u/s of Great America and Sunnyvale East Excavation Sites consist only of that portion of the study reach that was actually excavated. For Sunnyvale East, this comprises the entire east bank; with the west bank acting as the Adjacent Reference Site. For San Tomas, where excavation alternated from side to side several times, and often did not completely remove all of the vegetation on the excavated bank side, the Excavation Study site comprises alternating portions of both banks. All unexcavated areas of the reach, regardless of bank position, serve as the Adjacent Reference Site. The Excavation Site on San Tomas was determined by mapping the extent of excavation after the project in using field surveys, a January 1999 aerial photo and Geographic Information System (GIS). Areas not affected by excavation comprise the Adjacent Reference Site.

Preproject assessments were conducted for all 1997 and 1998 Excavation Sites prior to sediment removal. To date, three years of postproject assessments have been conducted for all 1997 and 1998 Excavation Sites. Data from the 1997 preproject assessments is used as the baseline for postproject comparisons. Although the 1995 preproject assessment data has not been used for the baseline, the data was presented in the first annual Study report because it provides relevant information regarding past conditions, provides additional information on temporal variation in wetlands, and was the basis of project impacts assessments for environmental review and permitting documents (TRA 1995 and 1997).

Reference Sites

There are two types of reference sites. Adjacent Reference Sites are located near Excavation Sites, and General Reference Sites are situated at random locations within the District's projected long-term sediment removal program area (Tables 2 and 3, Figures 1 and 2).

Adjacent Reference Sites

Adjacent Reference Sites are used to monitor wetland vegetation conditions in areas near Excavation Sites. These sites provide a point of reference from which to distinguish those features of the nearby reestablishing site that are directly related to the sediment removal impact and those that reflect variability related to other causes. For example, if flooding scours a streambed within an Excavation Site, it would likely scour the streambed in the Adjacent Reference Site. By comparing both sites, conditions resulting from flood scouring could be distinguished from conditions resulting from sediment removal.

Adjacent Reference Sites were selected to be as similar to Excavation Study Sites as possible. However, in most cases, areas adjacent to Excavation Study Sites differ in one or more features, such as channel configuration, width, length, vegetation abundance, or hydrology. No reference site is identical to an Excavation Site. For tidal Excavation Sites in which only one side of the channel was excavated (Lower Penitencia and Sunnyvale East), the opposite, unexcavated sides serve as the reference. In the case of San Tomas u/s of Great America, all unexcavated portions of the project reach regardless of bank serve as the reference (see Excavation Site section above). Suitable reference sites were not available in some cases because adjacent areas were too dissimilar from Excavation Sites or were proposed excavation sites. The location and approximate length of each Adjacent Reference Site is listed in Table 2. Adjacent Reference Sites were first surveyed in 1998, except Lower Penitencia, Jones, and South Morey Channel, which were also surveyed in prior years.

General Reference Sites

General Reference Sites provide additional information regarding the general background condition and interannual variability of instream wetlands not recently impacted by sediment removal. Locating General Reference Sites within the District's projected long-term program sediment removal work area ensures that the channel reaches randomly selected for study have features likely to support instream wetlands (e.g., modified channels with relatively flat beds and little overstory vegetation).

General Reference Sites were randomly selected in the following way:

- All earthen channels with at least 1,000 linear feet of projected sediment excavation work area were considered for study. If the work area on a reach of stream ("work reach") had heterogeneous features (e.g., variable channel widths), it was segmented into homogeneous subreaches (e.g., having similar widths).
- Study sites are 10% samples, by length, of the total work reach or subreach. The location of the study site within the reach was selected randomly using the District's stream station identification numbers.
- The selected study site locations were identified by station number on a District facilities map, and then located in the field for surveying.

General Reference Sites could not be part of any area subject to or planned for sediment removal in 1997 or 1998 or part of an Adjacent Reference Site.

Ten nontidal General Reference Sites were randomly selected from approximately 50 sites meeting the study criteria (Table 3). The four tidal sites represent all proposed long-term maintenance program reaches meeting the study criteria. Nontidal sites were first sampled in 1997; tidal sites were sampled beginning in 1998. (Note: The Guadalupe River tidal site was first sampled in 1997 by H.T. Harvey and Associates [1997] as part of a survey for the Lower Guadalupe flood control project, H.T. Harvey 1997.)

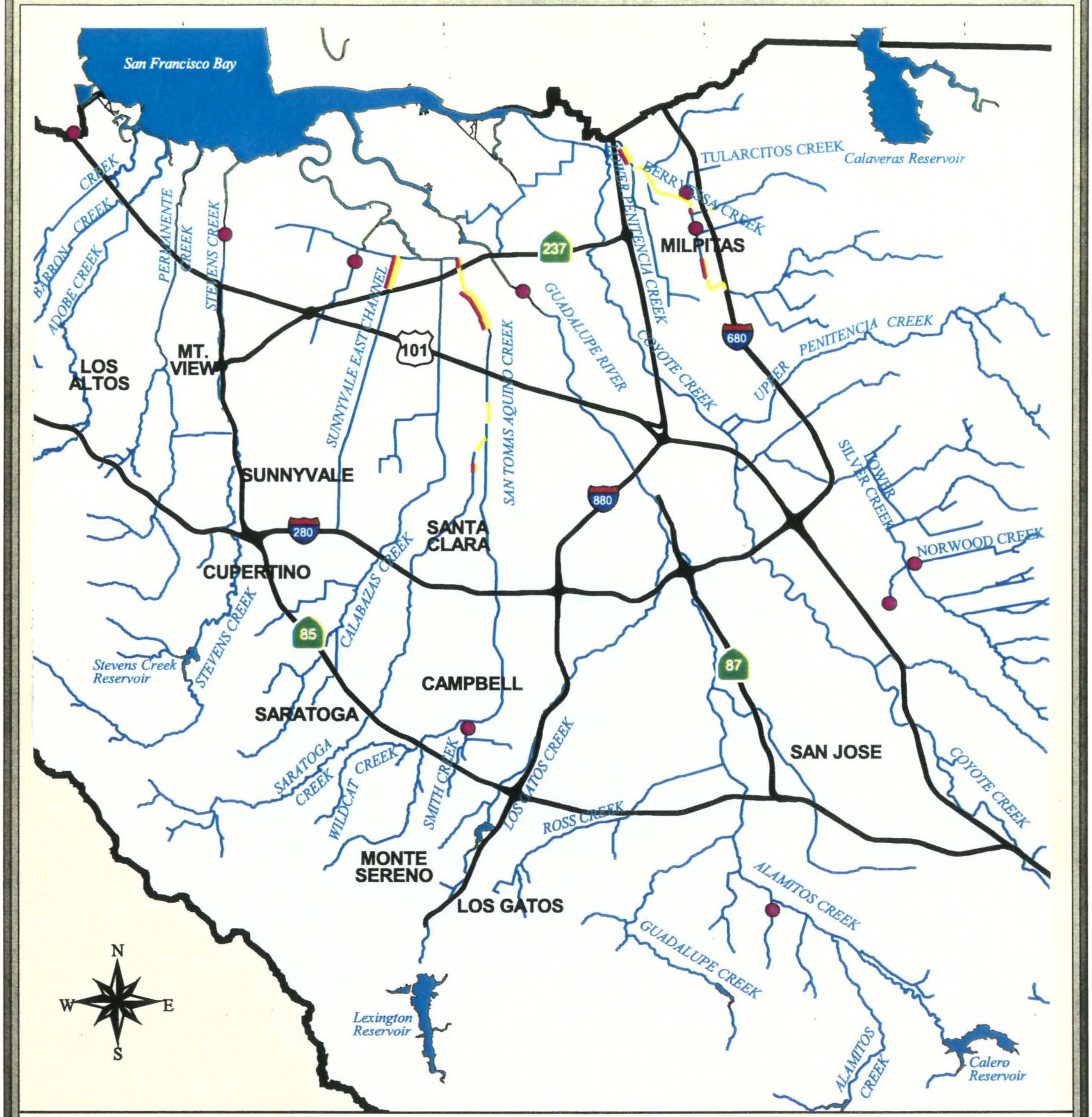


Figure 1.

Wetland Vegetation Regrowth

Study Site Locations: North County

Santa Clara Valley Water District

g\gis\projects\000407\rq98_095\wetland.apr

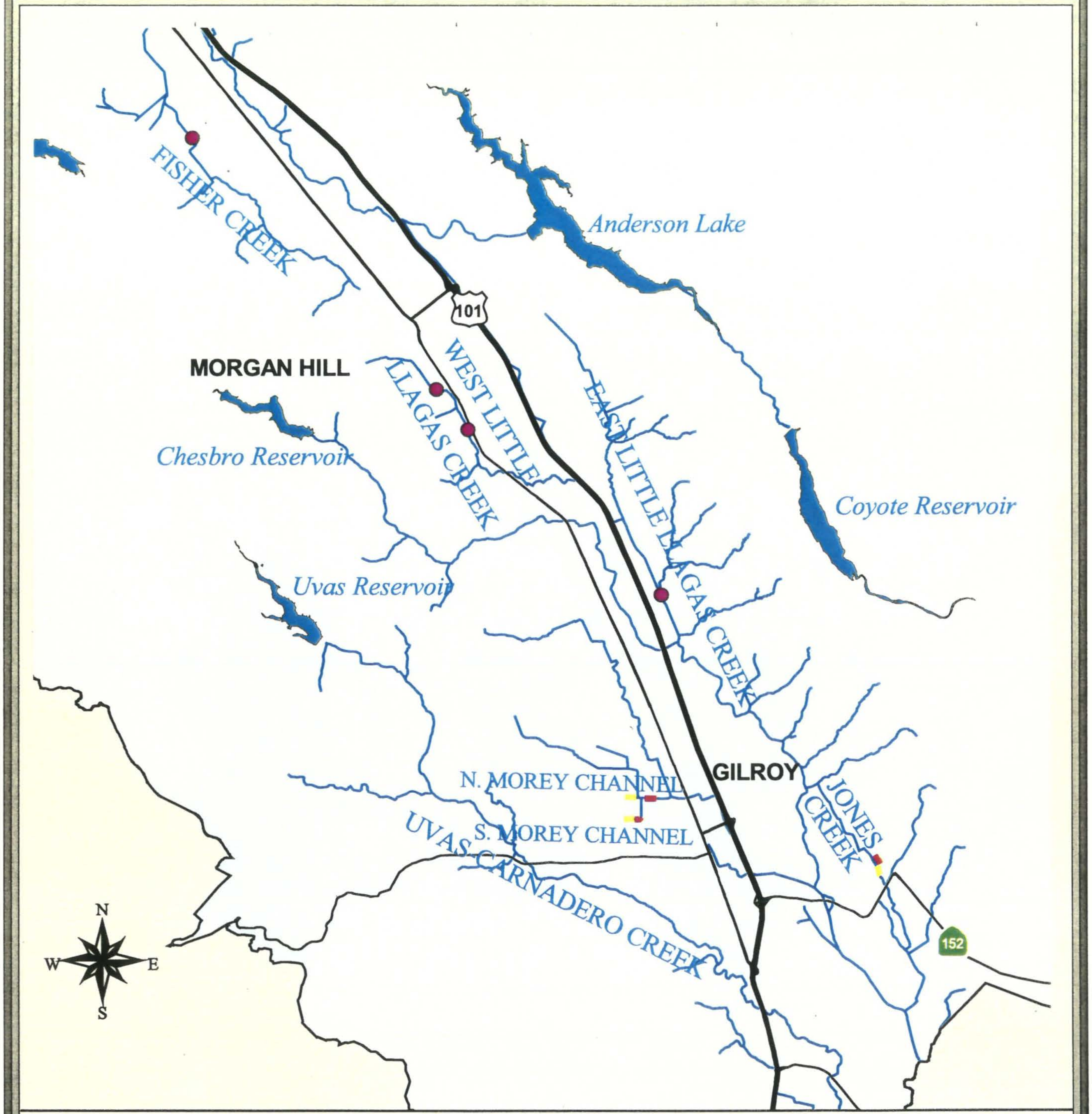


Figure 2.

Wetland Vegetation Regrowth
Study Site Locations: South County

Santa Clara Valley Water District

g\gis\projects\000407\rq98_095\wetland.apr

TABLE 1
Excavation Sites

Stream	Location	Tidal	Nontidal	Approximate Length (ft.)
1997 Excavation Study Sites				
Berryessa Creek u/s Lower Penitencia	(same as 1998 site)	—	—	—
Jones Creek	d/s Highway 152	—	X	920
Lower Penitencia Creek	d/s Milmont Avenue	X	—	1,915
Los Coches Creek	d/s Park Victoria Drive	—	X	310
North Morey Channel	d/s Santa Teresa Boulevard	—	X	1,010
San Tomas Aquino Creek (tidal portion) u/s Highway 237	Highway 237 to Great America Parkway	X	—	2,500
San Tomas Aquino Creek (nontidal portion)	u/s Central Expressway	—	X	2,300
Saratoga Creek	u/s San Tomas Aquino confluence	—	X	2,000
South Morey Channel	d/s Santa Teresa Boulevard	—	X	830
1998 Excavation Study Sites				
Berryessa Creek u/s Lower Penitencia	Lower Penitencia Creek to Calaveras Boulevard	X	X	8,600
Berryessa Creek	u/s Montague Expressway	—	X	3,500
San Tomas Aquino (tidal portion) u/s Great America Parkway	Great America to u/s of Hetch Hetchy Pipeline crossing	X	—	5,300
Sunnyvale East Channel	d/s Highway 237	X	—	2,500
			TOTAL:	**31,685 ft., 6.0 mi.**

TABLE 2
Adjacent Reference Sites

Excavation Study Site	Corresponding Adjacent Reference Site	Approximate Length (ft.)
Berryessa Creek u/s Lower Penitencia Creek	Berryessa Creek d/s Los Coches Avenue	500
Jones Creek	Jones Creek d/s Excavation Study Site	920
Lower Penitencia Creek	Lower Penitencia parallel to Excavation Site (east channel)	1,915
Los Coches Creek	None	—
North Morey Channel	Lions Creek d/s Kern Avenue	1,000
South Morey Channel	South Morey d/s Excavation Site	830
San Tomas Aquino Creek (tidal portion) u/s Highway 237	San Tomas Aquino d/s Highway 237	700
San Tomas Aquino Creek (nontidal portion) u/s Central Expressway	None	—
Saratoga Creek u/s San Tomas Aquino Creek	Saratoga Creek u/s Warburton Avenue	1,020
Berryessa u/s Lower Penitencia	Same as Berryessa above	—
Berryessa u/s Montague Expressway (1998)	Berryessa d/s Montague Expressway	2,200
San Tomas Aquino (1998 tidal portion) u/s Great America Parkway	San Tomas Aquino parallel to Excavation Study Site	5,300
Sunnyvale East d/s Highway 237	Sunnyvale East Channel parallel to Excavation Study Site (west bank)	2,500
	TOTAL:	**16,895 ft., 3.2 mi.**

TABLE 3
General Reference Sites

Stream	Location (Station Number)	Approximate Length (ft.)
Nontidal Sites		
Berryessa Creek	109+85–112+00	215
East Little Llagas	45+00–47+20	220
Fisher Creek	149+00–150+00	100
Greystone Creek	11+00–13+10	210
Lower Silver Creek	373+95–375+00	105
Norwood Creek	7+80–11+00	320
Smith Creek	8+80–10+00	120
Tularcitos	9+00–12+80	380
West Little Llagas u/s of Cosmo Avenue	100+00–101+00	100
West Little Llagas d/s of Main Avenue	152+00–152+80	80
Tidal Sites		
Guadalupe River	318+00–325+50	750
San Francisquito*	73+00–74+00	100
Stevens*	90+00–92+20	220
Sunnyvale West	58+00–62+40	440
	TOTAL:	**2,920 ft., 0.6 mi.**

* Removed from Study in 2001 after sediment excavation work in 2000.

SITE ASSESSMENTS

Wetlands assessed in all years were identified based on criteria set forth in the Corps of Engineers (Corps) 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Wetlands were identified based on three parameters as defined by the Corps: hydrophytic vegetation, hydric soils, and wetland hydrology. Potential wetlands were first identified based on site vegetation features. If the "prevalent vegetation consists of macrophytes that are typically adapted to areas having hydrologic and soil conditions" that occur in wetlands then the criterion for wetland vegetation was met. Hydrophytic species are classified as Obligate (OBL), Facultative Wet (FACW), and Facultative ([FAC] Reed 1988, Appendix A). If the vegetation criterion was met, the site was further investigated to determine the hydrology status. Positive wetland hydrology indicators for study sites most frequently consisted of visual observation of inundation and/or soil saturation. Other positive indicators included the presence of water marks, drift lines, waterborn sediment deposits, water-stained leaves, algal mats, and drainage patterns within wetlands. The soils of instream sites best fit the descriptions of either Riverwash or Tidal Marsh soils (Soil Conservation Service 1968). These both are classified as hydric soils by the Soil Conservation Service (1992). In addition, soils in tidal and inundated areas were subject to an aquic or peraquic moisture regime. In order to assess wetland extent, all surveys since 1997 have been conducted late in the growing season (generally August through October for tidal and perennially wet streams; early summer for summer-dry streams). In 1995, several sites were surveyed early in the growing season. The late-season 1997 data, rather than the early-season 1995 data, will be used for comparison with postproject data. No update of 1995 data was available in 1997 for one 1997 Excavation Study Site, Berryessa u/s of Lower Penitencia.

Color 35mm or digital photographs were taken of each site during the field surveys. On sites that were repeatedly surveyed, photographs were taken, in most cases, from the same vantage point during successive surveys.

Total rainfall in San Jose for the 2001 season (July 1, 2000 to June 30, 2001) was 11.10 inches, which is 78 percent of the long-term average of 14.21 inches. This somewhat drier year followed a relatively normal rainfall year in 2000 (13 inches) and a drier year in 1999 (11 inches).

Wetland vegetation reacts rapidly to changes in water availability, and amount and locations of wetlands are expected to vary depending on immediate past conditions. Jurisdictional wetlands, by definition, pertain to conditions found under "normal circumstances." In practice, features that have deviated due to "abnormal" circumstances can be difficult to identify, especially in the disturbed systems that are the focus of this study. However, in wetter than average cycles, assessment of wetland boundaries based on current conditions may lead to the overestimate of jurisdictional area, while in drier than normal years, assessments based on current conditions may lead to underestimation.

Vegetation Description

All 1998 through 2001 surveys were conducted using the standard protocol described below. The 1995 and some of the 1997 assessments were conducted prior to formalizing the vegetation characterization protocol (see Rankin and Hillman 1999 for pre-2000 assessment details).

Information sufficient to complete the SCVWD Wetland Assessment Checklists was gathered in the field (checklists presented in Appendices B, C, and D). Information included the determination of the Vegetation Dominance Type (Table 4) and Vegetation Quality Indicators (Table 5) of each wetland type.

The Vegetation Dominance Type categories represent vegetation dominance types typically found within local streams. The tall, native, grasslike perennial emergents that are typical dominants were collectively assigned a separate category for nontidal wetlands (e.g., Cattail, bulrush, burred, or mix), because these wetlands have a distinctive physiognomy. The grasslike emergents are further separated into species-specific categories (Alkali Bulrush, etc.) in tidal areas, because species may correlate with salinity gradients. The Other Natives category in tidal and nontidal areas includes wetlands dominated by natives other than the typical tall, grasslike, emergents. Locally common dominants include watercress (*Rorippa nasturtium-aquaticum*), yellow water primrose (*Ludwigia peploides* spp. *peploides*), tall cyperus (*Cyperus eragrostis*), and a variety of smartweeds (*Polygonum* spp.)

Classification of vegetation characteristics first entailed viewing the site to become familiar with the wetland type or types on site. A wetland was considered to be one type if topographic position, dominance type, and quality indicators were fairly uniform. After creating a list of component species, the Vegetation Dominance Type and Vegetation Quality Indicators were estimated. On rare occasions, vegetation quality characteristics were so close to the edge of a category that its categorization was uncertain. In such cases, both categories were indicated for that particular feature.

Site assessments were conducted by botanists or wetland scientists experienced with vegetation sampling methods. Qualitative (semiquantitative) categorization of vegetation within broad, easily distinguished classes is a standard vegetation description procedure used in ecological studies (Bonham 1989, Mueller-Dombois 1975).

TABLE 4
Vegetation Dominance Types

Dominance (>50% Relative Cover)	
Tidal	**Nontidal**
a. Alkali bulrush	a. Bulrush, cattail, burred, or mix
b. California bulrush	b. Other native(s)
c. Cattail	c. Nonnative(s)
d. Cattail/bulrush mix	d. Other (describe)
e. Other native(s)	
f. Nonnative	
g. Other (describe)	

TABLE 5
Vegetation Quality Indicators

Vegetation Quality Indicators	Categories				
	A	B	C	D	E
Total percent cover	76–100%	51–75%	26–50%	11–25%	10% or less
Native species relative percent cover	76–100%	51–75%	26–50%	11–25%	10% or less
Invasive species relative percent cover	5% or less	6–25%	26–50%	51–75%	76–100%

Only those species considered to be aggressive invaders of local wetlands were designated as invasive species for the purposes of classification of vegetation quality. These were limited to broad-leaf peppergrass (*Lepidium latifolium*) and giant reed (*Arundo donax*). Numerous other nonnative, weedy species occur regularly in local wetlands, but based on current knowledge, these are either naturalized, or not specifically known to encroach into already occupied habitat. Common examples included Italian ryegrass (*Lolium multiflorum*), cocklebur (*Xanthium strumarium*), bristly ox-tongue (*Picris echioides*), creeping bentgrass (*Agrostis stolonifera*), barnyard grass (*Echinochloa crus-galli*), dallis grass (*Paspalum dilatatum*), and Bermuda grass (*Cynodon dactylon*). All plant nomenclature is per the Jepson Manual (Hickman 1993).

Determination of Wetland Area

Wetland area, in all years, was determined using standard methods for wetland delineation including (1) field measurement; (2) delineation of boundaries, as determined in the field, onto transparent mylar sheets overlain on aerial photographs (scale 1″=50′); or (3) a combination of 1 and 2 (for prior measurement exceptions see Rankin and Hillman 1998).

Photographs were primarily used for mapping wetland boundaries on sites where the extent of the wetland was relatively large. Smaller sites had narrow channels or limited extent of wetland, such that wetland areas would not be easily visible on photographs at the 1″=50′ scale. These sites were, and will continue to be sampled solely by field measure: these include all General Reference Sites (except the Guadalupe River site), Berryessa Creek u/s Montague Expressway, Jones Creek, and North and South Morey Channels. Photographs for several fairly large sites were first available in 1999 for the Sunnyvale East Excavation and Adjacent Reference, San Tomas Aquino d/s of Highway 237 Adjacent Reference, and Saratoga Creek Adjacent Reference Sites. In prior years, wetland amounts here were determined by field measure.

Assessments conducted with aerial photographs taken prior to 1997 used blueline reproductions of rectified photographs. Acreage determinations were made either with AutoCad (computer aided design program) or by planimetry. With only two exceptions, since 1997, all photographs have and will continue to be taken in color.

The photographs are taken in mid to late summer, during the growing season, and as close as possible to the time of field surveys. Photographs are taken near noon and during low tides (on tidal sites).

All aerial photos since 1997 were transferred into digital form for rectification and measurement. Aerial photograph diapositives were scanned into digital raster files. At least five photo-identifiable points in each photograph were surveyed with differentially corrected GPS, producing coordinates (California State Plane Coordinate System, Zone 3, North American Datum [N.A.D.] 83) used to rectify each photograph with Autodesk Imaging software. Photo-control points are expected to be within a 95% confidence ellipse of less than 3 feet from their actual location. The data were used to produce a geo-referenced image for use in ESRI's Arcview 3.1 GIS. Wetland boundary information from the mylar overlays, or delineated directly onto the electronic image, was digitized into the GIS.

Boundaries of excavation areas were directly digitized onto postproject digital aerial photographs (shots in winter of 1997 and 1998) in the GIS to determine the actual limits of excavation (and the actual amount of wetland removed) on the partially excavated tidal sites (1997 San Tomas [tidal] u/s Highway 237 and Lower Penitencia; 1998 Berryessa u/s of Lower Penitencia and San Tomas [tidal] u/s Great America Sites). Boundaries between excavated and unexcavated areas were easily distinguishable on photographs. For the 1998 San Tomas (tidal) u/s Great America Site, the delineated boundary of excavation also defines the Excavation Study Site. In 1999, using the GIS, the excavation area mapped in 1998 was superimposed upon the wetland area mapped in 1999 in order to determine the amount of wetland present within the Excavation Study Site. All wetland outside the excavation boundaries on the project reach is part of the Adjacent Reference Site. The same approach will be used to measure wetlands on the 1998 project San Tomas Aquino (tidal) Excavation and Adjacent Reference Sites in future years.

To ensure that precision of data comparisons was not overestimated, measurements on the larger Excavation Study and Adjacent Reference Sites are reported to the nearest 0.1 ac, rather than 0.01 ac. Calculations were conducted using measures to the nearest 0.01, and small discrepancies may result from rounding errors. Measurements on the smaller General Reference sites, which were consistently field-measured, will be reported in square feet (sq ft) and to the nearest 0.01 ac.

2001 Sampling Update

Berryessa u/s, d/s Montague Excavation and Adjacent Reference Sites

As in previous years, the Excavation and Reference sites on the nontidal section of Berryessa Creek were surveyed at different times of the year in order to capture the seasonal wetland characteristics for both ephemeral and perennial sections of the stream (for details see Rankin and Hillman 2000). The Excavation site was surveyed in June before the stream went dry, while the Reference site was surveyed in September, the typical sampling time for perennial streams. The summary and comparison tables in the Results section reflect these alternate sampling times. The comparison is still appropriate since each site was surveyed during the height of the growing season.

Sites removed from study

Two Reference sites, Stevens Creek and San Francisquito Creek, were removed from the Study after the 2000 sampling season due to District sediment excavation within the study area on those creeks. As per Study protocol, sites that experience sediment excavation during the course of the Study are to be removed.

The Sunnyvale East Excavation and Adjacent Reference Sites were partially excavated at the Caribbean Dr. bridge in July 2001. In order to obtain data for the 2001 study season, the sections scheduled for sediment removal were surveyed prior to excavation in July, while the rest of the site was surveyed at its normal time in September.

Future Assessments

According to study design, postproject Excavation Study Site surveys and Adjacent Reference Site surveys were conducted annually for 3 years after each project was completed (year 2000 for 1997 project sites and year 2001 for 1998 project sites) or until the next sediment removal activity occurred on an Excavation Site, if sooner. General Reference Site surveys were to continue until all Excavation Site surveys were completed. If sediment removal occurred at an Adjacent or General Reference Site during the course of the Study (such as on San Francisquito and Stevens Creeks in 2000), further study of the site was to be discontinued. As of this report, all surveys have been completed.

This report evaluates study results to date and compares them to the original study objectives.

RESULTS

EXCAVATION SITES

1998 Project Excavation Sites: Third Year Postproject Comparisons

Results of the third, and final year, post-project 2001 assessments for the 1998 Excavation Sites are summarized in Table 6. Checklists and site photographs are located in Appendices B and E.

Wetland Acreage: Comparison of the Present Year to the Baseline

A total of 9.5 acres of wetland was present in 2001 (Table 7). This is an increase of 0.2 acres since 2000. Total wetland regrowth in 2001 was 149% (7.2 acres) compared to removal in 1998 (4.8 acres). Nontidal regrowth was 178% (3.6 acres), while tidal regrowth was 128% (3.6 acres) of 1998 values.

All tidal and nontidal sites attained well over 100% regrowth by 2001, three years post-project, except for Sunnyvale East (24%). The greatest percent regrowth occurred on Berryessa u/s Montague Expwy (600%), although actual increases in acreage were small.

Vegetation Dominance and Quality: Comparison of the Present Year to Last Year

Vegetation dominance shifted on only one site in 2001 (Table 7). On Berryessa u/s Montague Expwy, the site was once again dominated by Nonnatives rather than Other Native vegetation as in 1999. On Berryessa u/s Lower Penitencia, a small amount of California Bulrush formed a dominant vegetation type in addition to Cattail, Other Native, and Nonnative vegetation.

Higher relative cover of natives in 2001 was found on three of the five sites. Vegetation quality shifts included higher relative cover of natives on three of the five sites, lower relative cover of natives in one vegetation type (in the Cattail-dominated type on Berryessa u/s Lower Penitencia), and one decrease in total cover (Sunnyvale East). In all cases, categories shifted only one increment.

Vegetation cover values were in the highest category (76-100%; Table 6) on all sites except Sunnyvale East. Native species relative cover was variable , while invasive species relative cover was in the lowest category (5% or less) for all sites.

Table 6. 1998 Project Excavation Sites: Summary of Third Year (2001) Post-Project Assessments

Site/Year	Month Surveyed	Survey Method[1]	Wetland Area (acres)[2]	Vegetation Dominance Type[3]	Vegetation Quality Indicators[4]
Berryessa L. Pen to Calaveras	Oct.	field/photo	0.8	t-cattail	ABA
			0.3	t-other native	AAA
			0.7	t-non-native	ACA
			0.1	t-Ca. Bulrush	AAA
		Tidal Subtotal	1.9		
			1.6	other native	AAA
			0.9	cattail	AAA
			1.0	other native	ABA
			1.6	non-native	ACA
		Nontidal Subtotal	5.2		
		Site Total =	7.1		
Berryessa u/s Montague to Hwy 680	Jun.	field	0.3	non-native	ACA
San Tomas (tidal) u/s Great America Pkwy	Sept.	field/photo	0.5	t-Ca. Bulrush	AAA
			1.6	t-other native	AAA
			0.0	t-non-native	ACA
		Site Total =	2.0		
Sunnyvale East	Sept.	field/photo	0.1	t-other native	BBA

[1] Survey Method: field/photo = field surveys with photograph; field = field measures only; photo= photographic measures, not field-surveyed.

[2] Numerical discrepancies can be accounted for due to the rounding of values.

[3] See Table 4: Vegetation Dominance Type: t = tidal

[4] See Table 5: Vegetation Quality Indicators

Table 7. 1998 Project Excavation Sites: 1998 (Preproject) Through 2001 (Third Year Postproject) Comparisons

WETLAND AREA (acres)^{1,2}									
Site	1998	1999	2000	2001	Amount of Wetland Removed (1998)	Amount of Wetland Regrowth (2001)	Change From 1998-2001	2001 Regrowth Compared to 1998 Removal (%)	Vegetation Dominance and Quality Status
Nontidal									
Berryessa u/s Lower Penitencia	3.8	4.5	5.5	5.2	2.0	3.3	1.3	167	Site remains dominated by Cattail, Other Natives, and Nonnatives. Some Nonnative vegetation with higher relative cover of natives.
Berryessa u/s Montague Expressway	0.1	0.1	0.1	0.3	0.1	0.3	0.3	600	Site once again dominated by Nonnatives rather than Other Natives (as in 1999).
Nontidal subtotal	3.9	4.5	5.5	5.5	2.0	3.6	1.6	178	
Tidal									
Berryessa u/s Lower Penitencia	0.8	1.3	1.8	1.9	0.3	1.4	1.1	504	Site now dominated by a small amount of California Bulrush in addition to Cattail, Other Native, and Nonnative vegetation. Cattail vegetation with lower relative cover of natives, and Other Native vegetation with higher cover of natives.
San Tomas (tidal) u/s Great America Parkway	2.0	1.1	1.9	2.0	2.0	2.0	0.0	102	Site remains dominated by California Bulrush, Other Native, and Nonnative vegetation. Higher relative cover of natives in the Ca Bulrush and Other Native vegetation.
Sunnyvale East	0.5	0.0	0.1	0.1	0.5	0.1	-0.4	24	Site remains dominated by Other Natives. Decrease in total cover.
Tidal subtotal	3.3	2.4	3.8	4.1	2.8	3.6	0.8	128	
Total	**7.2**	**7.0**	**9.3**	**9.5**	**4.8**	**7.2**	**2.4**	**149**	

[1] Numerical discrepancies are due to the rounding of values.

[2] 0.0 indicates wetland present but at value less than 0.05.

REFERENCE SITES

1998 Adjacent Reference Sites: Comparisons for 2001

Results of the 2001 assessments for the 1998 Project Adjacent Reference Sites are summarized in Table 8. Checklists and site photographs are located in Appendix C and E.

Wetland Acreage

Total wetland present in the 1998 Adjacent Reference Sites in 2001 was 3.5 acres (Table 9). This is an increase of 0.3 acres since 2000. Wetland in 2001 was 203% of 1998 values. Nontidal and tidal values in 2001 were 280% and 196% of 1998, respectively. Wetland increased on all sites except for Berryessa d/s Montague Expwy, which exhibited a 0.1 acre decrease from 2000 to 2001. All sites exhibited more wetland in 2001 than in 1998.

Vegetation Dominance and Quality

Vegetation dominance was unchanged on all sites except for Berryessa d/s Montague Expwy, which in 2001 supported a small amount of Cattail in addition to Other Native vegetation (Table 9). Two sites exhibited a change in vegetation quality status. Berryessa d/s Montague Expwy had a lower cover of natives in one vegetation type, while San Tomas u/s Great America Expwy exhibited a higher relative cover of natives in two vegetation types. Berryessa d/s Los Coches Ave. and Sunnyvale East experienced no change in either vegetation dominance or quality.

All sites had total vegetation cover values in the highest category (76-100%; Table 8) as in 2000. Native species relative cover was variable, with the majority of sites in the higher categories, while invasive species relative cover was in the lowest category (5% or less) for all categories.

GENERAL REFERENCE SITES

Results of the 2001 assessments for the General Reference Sites are summarized in Table 10. Checklists and site photographs are located in Appendix D and F.

Wetland Acreage

Total wetland present on the general reference sites in 2001 was 161,116 sq. ft. (3.69 acres; Table 10). This is a slight decrease from 2000 (167,447 sq. ft.; Table 11). Wetland in 2001 was 96% of that present in 2000. Nontidal and tidal amounts were 91% (13,457 sq. ft.) and 97% (147,659 sq. ft.) of 2000 values, respectively.

From 2000 to 2001, four sites exhibited an increase in wetland acreage, four

Table 8. Adjacent Reference Sites: Summary of 2001 Assessments

Site	Month Surveyed	Survey Method[1]	Wetland Area [2] (acres)	Vegetation Dominance Type[3]	Vegetation Quality Indicators[4]
Nontidal					
Berryessa d/s Los Coches Avenue	Sept.	field/photo	0.2	other native	ABA
			0.0	other native	AAA
		Site Total =	0.2		
Berryessa d/s Montague Expwy.	Sept.	field	0.2	other native	ABA
			0.0	cattail	AAA
		Site Total =	0.2		
Nontidal subtotal			**0.4**		
Tidal					
San Tomas (tidal) u/s of Great America Parkway	Sept.	field/photo	0.5	t-Ca. Bulrush	AAA
			1.6	t-other native	AAA
			0.2	t-non-native	ACA
		Site Total =	2.3		
Sunnyvale East	Sept.	field/photo	0.8	t-other native	AAA
Tidal subtotal			**3.1**		
Total			**3.5**		

[1] Survey Method: field/photo = field surveys with photograph; field = field measures only

[2] Numerical discrepancies can be accounted for due to the rounding of values.

[3] Vegetation Dominance Type: t = tidal

[4] See Table 5: Vegetation Quality Indicators

[5] "Cattail" in the nontidal sites was the dominant species in the "Cattail, Bulrush, Burreed, or mix" category.

Table 9. 1998 Project Adjacent Reference Site Comparisons: 1998-2001

	Wetland Area (acres)								
Site	**1998**	**1999**	**2000**	**2001**	**Change from '98-'01 (ac)**	**Change from '00-'01 (ac)**	**2001 Wetland compared to 1998 (%)**	**2001 Wetland compared to 2000 (%)**	**Vegetation Dominance and Quality Status**
Nontidal									
Berryessa d/s Los Coches Avenue	0.1	0.2	0.2	0.2	0.1	0.0	200	106	Vegetation dominance and Quality Indicators unchanged.
Berryessa d/s Montague Expressway	0.1	0.4	0.3	0.2	0.2	0.0	400	86	Site now dominated by Cattail in addition to Other Natives. Lower cover of natives in Other Native vegetation.
Nontidal Subtotal	**0.2**	**0.5**	**0.5**	**0.4**	**0.3**	**0.0**	**280**	**93**	
Tidal									
San Tomas (tidal) u/s of Great America Parkway	1.3	1.6	2.2	2.3	1.0	0.1	176	107	Site remains dominated by California Bulrush, Other Native, and Nonnative vegetation. Higher relative cover of natives in the Ca Bulrush and Other Native vegetation.
Sunnyvale East	0.3	0.4	0.6	0.8	0.5	0.2	283	130	Vegetation dominance and Quality Indicators unchanged.
Tidal Subtotal	**1.6**	**2.0**	**2.8**	**3.1**	**1.5**	**0.3**	**196**	**112**	
Total	**1.7**	**2.5**	**3.2**	**3.5**	**1.8**	**0.3**	**203**	**109**	

Table 10. General Reference Sites: Summary of 2001 Assessments

Site	Month Surveyed[1]	Wetland Area (sq ft)	Wetland Area (acres)[2]	Vegetation Dominance Type[3]	Vegetation Quality Indicators[4]
Non-tidal					
Berryessa u/s Los Coches Avenue	Oct.	1171	0.03	other native	AAA
East Little Llagas	Aug.	0	0	---	---
Fisher	Aug.	1177	0.04	other native	AAA
Greystone	Sept.	478	0.01	other native	ABA
Lower Silver	Sept.	1680	0.04	cattail	ABA
Norwood	Sept.	265	0.01	other native	CAA
Smith	Sept.	506	0.01	non-native	ACA
Tularcitos	Oct.	931	0.02	other native	AAA
		6289	0.14	cattail	AAA
Site total		7220	0.28		
West Little Llagas u/s Cosmo Avenue	Sep.	0	0	---	---
West Little Llagas d/s Main Avenue	Sep.	960	0.02	cattail	AAA
Non-tidal Total		13457	0.3		
Tidal					
Guadalupe River	Oct.	104,980	2.41	other native	ABA
		23,087	0.53	Ca bulrush	AAA
		15,246	0.35	cattail	AAA
Site total		143,313	3.29		
Sunnyvale West	Sept.	3594	0.08	other native	BAA
		752	0.02	Ca. bulrush	AAA
Site total		4346	0.1		
Tidal Total		147,659	3.39		
Total		**161,116**	**3.69**		

[1] All surveys were field measured except Guadalupe which used aerial photo

[2] Numerical discrepancies can be accounted for due to the rounding of values.

[3] Vegetation Dominance Type t = tidal

[4] See Table 5: Vegetation Quality Indicators

[5] "Cattail" in the nontidal sites was the dominant species in the "Cattail, Bulrush, Burreed, or mix" category.

sites exhibited a decrease in wetland acreage, and four sites showed no change. As in past years, of the sites with no change in wetland area, two sites continued to remain dry with no wetland in the channel (East Little Llagas and West Little Llagas u/s Cosmo Ave), and two sites were completely vegetated to capacity (Tularcitos and West Little Llagas d/s Main Ave). On sites where wetland increased, wetland amounts ranged from 102-227% of that present in 2000; where wetland decreased, amounts ranged from 28% to 78% of that present in 2001.

From 1997 to 2001, four sites exhibited an increase in wetland acreage, five sites exhibited a decrease in wetland, and two sites showed no change. The sites on which an increase in wetland acreage occurred were the same from 1997 to 2001 as from 2000 to 2001. Three sites which showed a decrease from 2000 to 2001 also showed a decrease in wetland from 1997 to 2001. Two sites remained the same from 1997-2001 and 2001-2002..

Of the tidal sites, two sites were removed from the Study in 2001 due to sediment excavation work within the project area. One of the remaining sites, Sunnyvale West, experienced a decline in wetland acreage from 2000 to 2001. Guadalupe River experienced a slight increase in wetland from 2000 to 2001.

Vegetation Dominance and Quality

There were no changes in vegetation dominance on the nontidal sites (Table 11). However, both tidal sites experienced changes. Guadalupe River was dominated in 2001 by Cattail in addition to the other vegetation types present in 2000, while Sunnyvale West transitioned from Nonnative and Other Native to California Bulrush and Other Native.

There were changes in vegetation quality on four of the ten nontidal sites and one of the two tidal sites. These changes mostly involved shifts in total cover and/or native species relative cover. The only change in invasive species relative cover was found on Sunnyvale West, where a lower invasive species cover was noted in 2001.

Table 11. General Reference Sites: Comparisons- 1997-2001

	Wetland Area (sq. ft.)					Change From		Wetland Area (%)		Acreage Change		2000-2001	
Site	1997	1998	1999	2000	2001	1997-2001	2000-2001	2001 compared to 1997	2001 compared to 2000	1997-2001	2000-2001	Change in Vegetation Dominance Status	Vegetation Quality Changes
Non-tidal													
Berryessa u/s Los Coches Avenue	2365	789	1502	1505	1171	-1194	-334	50	78	-	-	none	ABA to AAA
East Little Llagas	0	0	0	0	0	0	0	0	0	=	=	---	---
Fisher	1300	1300	1300	2140	1177	-123	-963	91	55	-	-	none	none
Greystone	44	965	425	211	478	434	267	1086	227	+	+	none	BBA to ABA
Lower Silver	720	1575	1680	1401	1680	960	279	233	120	+	+	none	AAA to ABA
Norwood	5304	0	440	930	265	-5039	-665	5	28	-	-	none	ABA to CAA
Smith	0	360	333	442	506	506	64	506	114	+	+	none	none
Tularcitos	7980	6750	7220	7220	7220	-760	0	90	100	-	=	none	none
West Little Llagas u/s Cosmo Avenue	100	447	0	0	0	-100	0	0	0	-	=	---	---
West Little Llagas d/s Main Avenue	960	960	960	960	960	0	0	100	100	=	=	none	none
Nontidal Total	**18773**	**13146**	**13860**	**14809**	**13457**	**-5316**	**-1352**	**72**	**91**				
Tidal													
Guadalupe River[3]	138,956	138,956	124,582	141,135	143,313	4357	2178	103	102	+	+	Other Native and Ca Bulrush to Other Native, Ca Bulrush and Cattail	none
San Francisquito[5]	no data	1040	930	4452	---	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stevens[5]	no data	650	75	371	---	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sunnyvale West	no data	3520	3598	6680	4346	N/A	-2334	N/A	65	N/A	-	Nonnative and Other Native to Ca Bulrush and Other Native	ACB and ABA to BAA and AAA
Tidal Total[4]	--	**144,166**	**129,185**	**152,638**	**147,659**	N/A	**-4979**	N/A	**97**				
Grand Total[4]	--	**157,312**	**143,045**	**167,447**	**161,116**	N/A	**-6331**	N/A	**96**				

[1] See Table 5: Vegetation Quality Indicators

[2] "Cattails" in the nontidal sites were the dominant species in the "Cattail, Bulrush, Burreed, or mix" category.

[3] 1997 and 1998 Guadalupe mapped wetland were re-measured with plainimitry and corrected values presented in 1999.

[4] Data totals not presented for tidal area in 1997 due to incomplete data set. Several areas were not surveyed until 1998.

[5] San Francisquito and Stevens Creeks were subject to sediment removal in 2000 and therefore were removed from the study in 2001.

DISCUSSION

SUMMARY FINDINGS

1998 Project Excavation Sites: Third Year Postproject Regrowth

The year 2001 was the third and final year of wetland surveys for the 1998 Project Excavation Sites. Since removal in 1998, vegetation regrowth has been substantial on both nontidal and tidal creeks (Figure 3). The greatest tidal and nontidal regrowth amounts occurred in the first post-project year (1999). By 2000, both tidal and nontidal regrowth as a whole had surpassed the amount of wetland removed in 1998 (Table 12). Less increase in vegetation acreage was seen in tidal areas in 2001, and the total amount in nontidal channels declined slightly. By 2001 regrowth amounts were 178% in nontidal and 128% in tidal areas collectively.

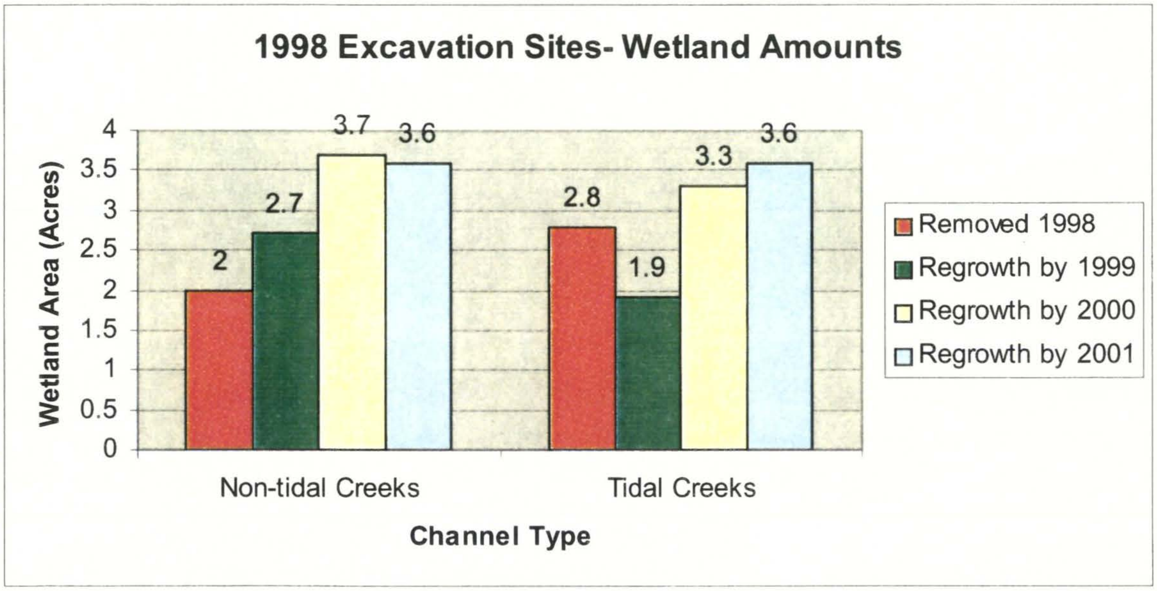


FIGURE 3. Wetland Regrowth Through 2001 in Tidal and Nontidal Creeks After Sediment Excavation in 1998

By the final year of post project surveys, all tidal and nontidal sites individually exceeded 100% regrowth except Sunnyvale East, which in 2001 had only 24% regrowth compared to removal (Table 7). As was stated in the 2000 report, the flat sediment bench that previously supported wetland has not re-established well since sediment removal occurred and therefore there is little appropriate substrate to support wetland.

Vegetation Composition

Three vegetation types (Other Native, Cattail, Nonnative) were present on the non-tidal sites in the preproject and all three postproject years (Figure 4). These three vegetation types were also present in all years on tidal sites. In addition, the California Bulrush vegetation type, not present prior to excavation, was present in the tidal areas in all post-project years.

Throughout the course of the study, other Native vegetation has been steadily increasing in both the nontidal and tidal sections of the 1998 Excavation Sites (Figure 4). By 2001, there was more Other Native vegetation present in both tidal and nontidal areas than before excavation, and more Other Native vegetation than any other vegetation type. Although the Cattail vegetation type increased in nontidal areas each year, by 2001 there was still less Cattail present than before excavation. By contrast, 2001 Cattail acreage exceeded the pre-project amount in tidal areas, although the Cattail amount actually declined from 2000 to 2001. Non-native vegetation amounts increased in both tidal and nontidal areas from post-project year 1 to 2 (1998-2000), then declined somewhat in year 3 (2001) as native vegetation types increased.

Table 12: Summary of 1997-01 Wetland Vegetation Regrowth Acreage Results

	2000 Regrowth (ac)	2001 Regrowth (ac)	Regrowth Compared to Removal (%)				2000 Amount (ac)	2001 Amount (ac)	1998 to 1997 (%)	1999 to 1998 (%)	2000 to 1997 (%)	2000 to 1998 (%)	2000 to 1999 (%)	2001 to 1998 (%)	2001 to 2000 (%)
			1998	1999	2000	2001									
1997 Excavation															
Nontidal	3.9	--	65	98	124	N/A									
Tidal	1.8	--	21	29	64	N/A									
Total	**4.2**	--	**45**	**67**	**97**	**N/A**									
1998 Excavation															
Nontidal	3.7	3.6	N/A	133	182	178									
Tidal	3.3	3.6	N/A	69	117	128									
Total	**7.0**	**7.2**	**N/A**	**96**	**144**	**149**									
1997 Adjacent Reference															
Nontidal							1.9	--	N/A	112	N/A	125	125	--	--
Tidal							3.8	--	N/A	118	N/A	131	111	--	--
Total							**5.7**	--	**N/A**	**116**	**N/A**	**129**	**111**	--	--
1998 Adjacent Reference															
Nontidal							0.5	0.4	N/A	353	N/A	300	85	280	93
Tidal							2.8	3.1	N/A	123	N/A	175	142	196	112
Total							**3.3**	**3.5**	**N/A**	**143**	**N/A**	**186**	**130**	**203**	**109**
General Reference															
Nontidal							0.3	0.3	70.0	105	79	113	107	102	91
Tidal							3.5	3.4*	N/A	90	N/A	106	118	N/A	97
Total							**3.8**	**3.7***	**N/A**	**91**	**N/A**	**106**	**117**	**N/A**	**96**

* Differences in acreage due to change in number of sites surveyed in 2001.

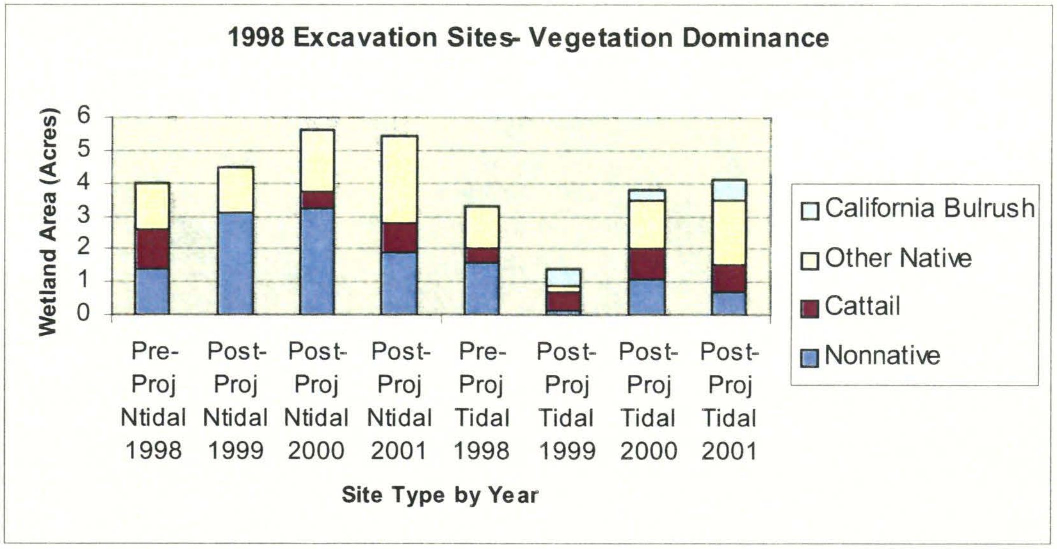


FIGURE 4. Vegetation Dominance Through 2001 in Tidal and Nontidal Sites After Sediment Removal in 1998

The complexity of vegetation types has been especially prevalent on the Berryessa Creek excavation site upstream of Lower Penitencia Creek (Figs. 5 and 6). Since the site was first studied in 1998, various combinations of tall emergent vegetation (mostly Cattail), Other Native (mostly water primrose and watercress, with some water smartweed), and Nonnative vegetation (cocklebur, ox-tongue thistle, and others) have dominated the low-flow channel and adjacent benches. These vegetation types have fluctuated in species dominance and cover from year to year, but typically the species composition has been relatively stable. Topographic variations in channel substrate most likely affect soil moisture levels, which have resulted in a larger number of vegetation types than has typically been seen on other study sites.

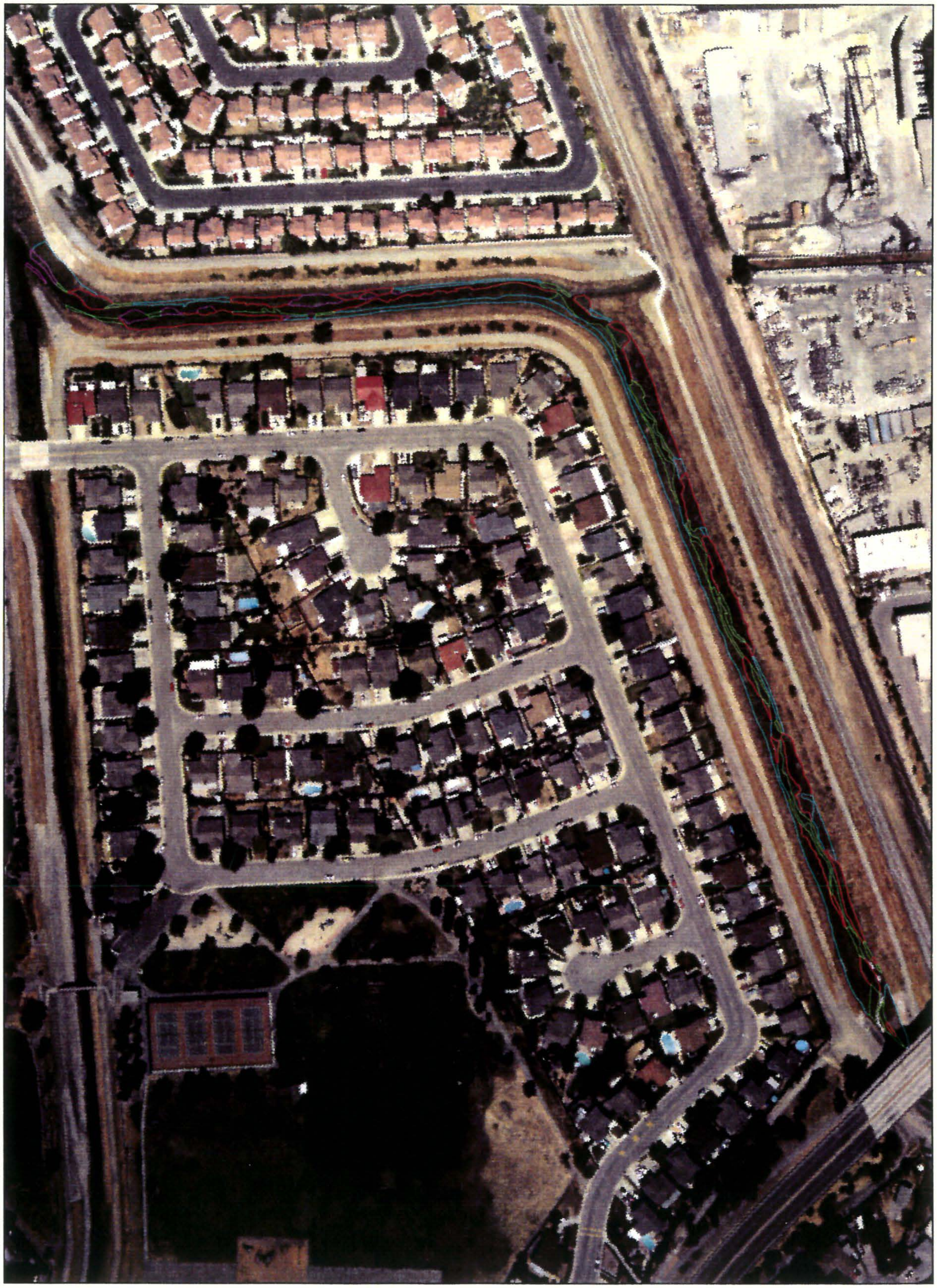

Wetland Boundary and Vegetation Type
Cattail
Other Native
Nonnative
California Bulrush
N
0
100
200
400
Feet
Santa Clara Valley Water District

Figure 5. Berryessa Creek U/S Lower Penitencia Creek

04.08.2002 007431.2001 08 berryessa1 11x17.mxd

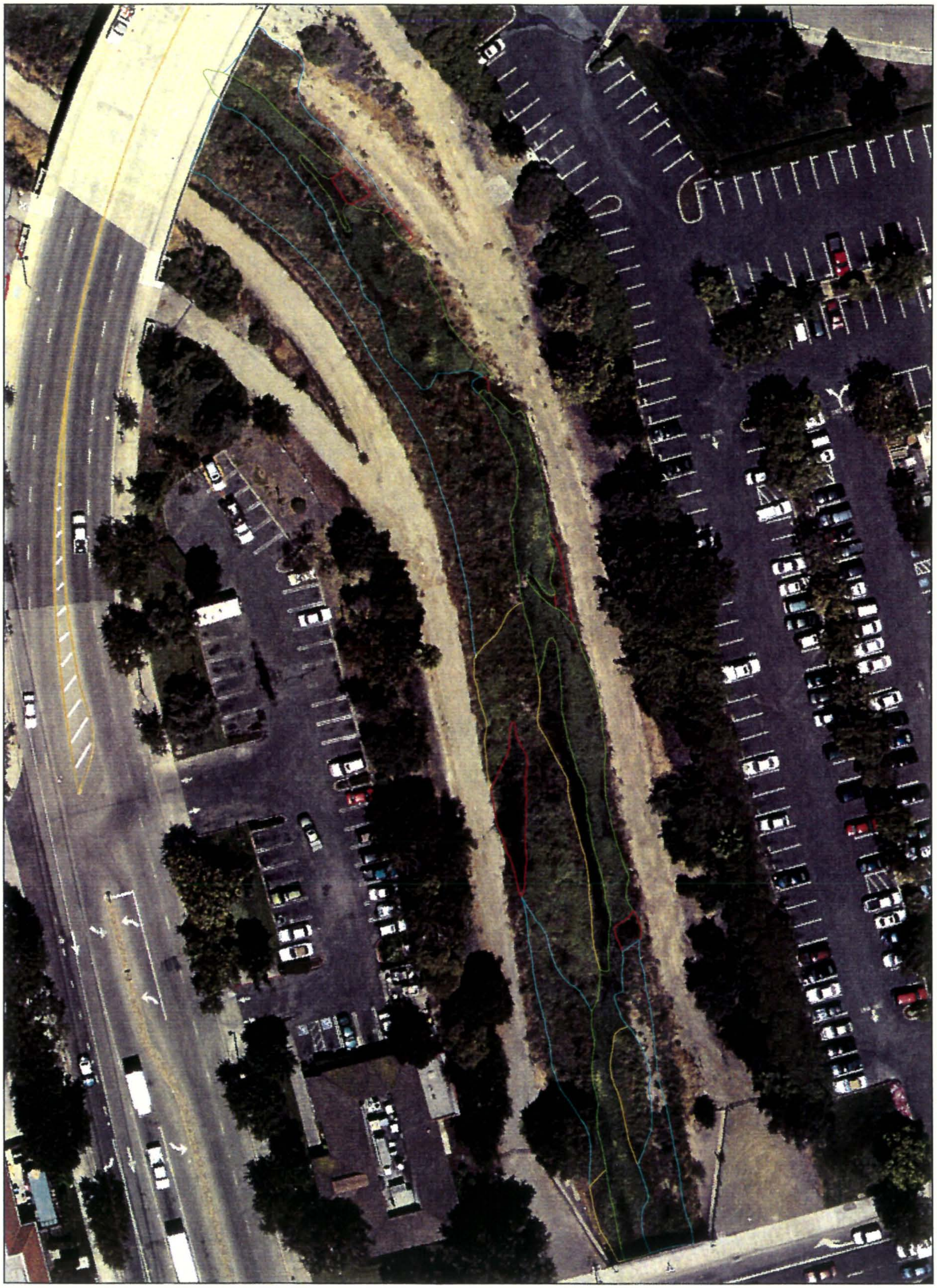


Figure 6. Berryessa Creek
Hillview Rd to Calaveras Blvd

04 (2002 0074 1 2001 20b berryessa2 11x17.mxd

Adjacent Reference Sites

Wetland acreage in the 1998 tidal Adjacent Reference sites increased steadily each year from1998 to 2001 (Figure 7). By 2001, acreage had almost doubled for the sites as a whole. In contrast, the largest increase in wetland acreage on the nontidal sites occurred from 1998 to 1999, when wetland area doubled. However, after an initial first year post-project growth spurt, the nontidal sites experienced a period of little to no growth from 1999 to 2000 and a slight decline in 2001. The vast difference in size between the total acreage of the tidal sites and the nontidal sites makes comparisons difficult. Because tidal sites were generally larger than nontidal sites, they supported more wetland than the nontidal sites. Similarly, several of the tidal sites had more potential for wetland expansion than the nontidal sites due to the initial presence of an unvegetated low-flow channel in which wetland could expand. This was especially true on the tidal San Tomas Aquino site. In contrast, the two nontidal reference sites on Berryessa Creek are small, narrow channels with less room for wetland expansion. Even with these differences, wetland vegetation on both nontidal and tidal sites as a whole doubled in acreage in the three year sample period.

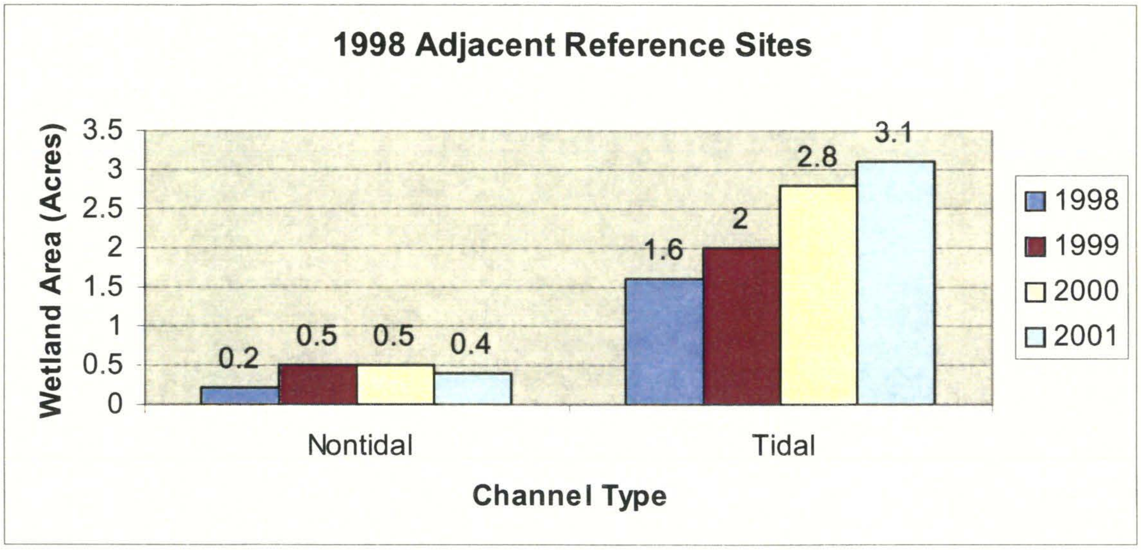


FIGURE 7. Wetland Acreage Through 2001 on 1998 Adjacent Reference Sites in Tidal and Nontidal Creeks

Vegetation Composition

The same three vegetation types present in the excavation sites were present at some time over the 4-year study period in the non-tidal adjacent reference sites (Figure 8). These showed variability in presence and abundance over time. Nonnative was the sole type present in year 1 (1998), was present in about the same amount in year 2, and then disappeared from these sites. Other Native vegetation was more abundant that the Non-native had been, and was present in years 2-4 (1999-01) at a fairly consistent level. A small amount of Cattail was also present in 2001.

Two of the three vegetation types present in the non-tidal excavation and reference sites (Other Native and Nonnative) were also present at some time over the 4-year study period in the tidal adjacent reference sites (Figure 8). These also showed variability in presence and abundance over time. Cattail was present in the tidal excavation sites but not in the reference sites. Other Native was the only type present in all 4 years. It comprised about 1/4 to 1/3 of the vegetation in years 1 and 2, when in co-occurred first with Non-native and then with California Bulrush. Nonnative abundance quadrupled in year 3, comprising the majority of the vegetation in years 3 and 4, with California bulrush and Nonnative also present. Fairly large declines were seen in the amount of Non-native present from year 1 to 2, and California bulrush present from year 2 to 3.

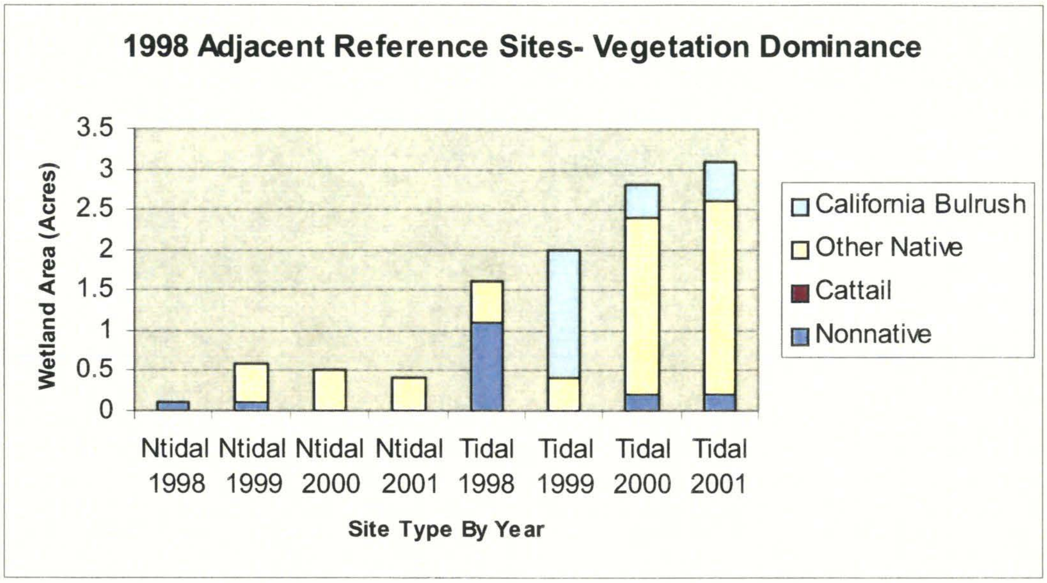


FIGURE 8. Vegetation Dominance Through 2001 in Tidal and Nontidal Reference Creeks

General Reference Sites

Total wetland vegetation amounts on nontidal General Reference Sites decreased from 1997 to 1998, then increased each year thereafter until year 2001, when they decreased slightly (Figure 9). Wetland area on the tidal sites has fluctuated throughout the study period (Figure 10). On the nontidal sites, 1997 was the year with the greatest total wetland, while on the tidal sites, the greatest wetland area occurred in 2000. The actual acreage changes on the nontidal sites were small, as wetland vegetation amounts were small. For the tidal sites, the reduction in acreage in 2001 is due to the fact that two of the four sites were removed from the study because sediment removal occurred prior to the 2001 field season. Most of the overall change in wetland acreage from 1998 to 2000 was due to fluctuations in wetland acreage on the Guadalupe River site, which is by far the largest of the General Reference Sites. The amount of wetland vegetation on site increased dramatically in 2000 after a decline in 1999 due to herbicide spraying. Wetland acreage continued to increase in 2001, but by a smaller amount.

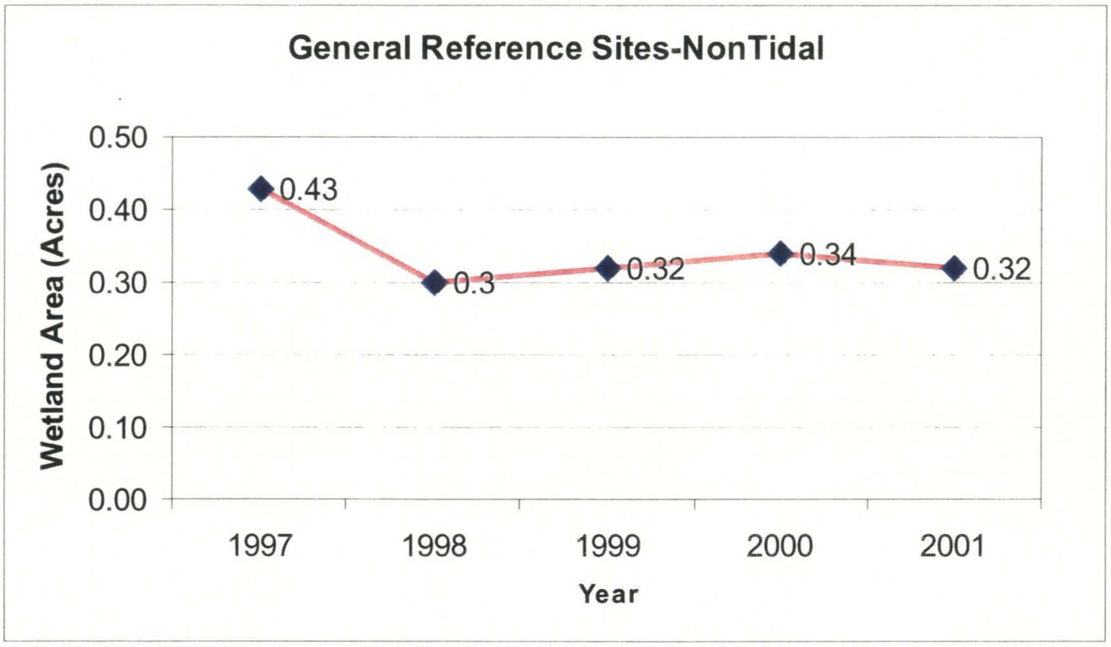


FIGURE 9. Wetland Acreage Through 2001 on Nontidal General Reference Sites

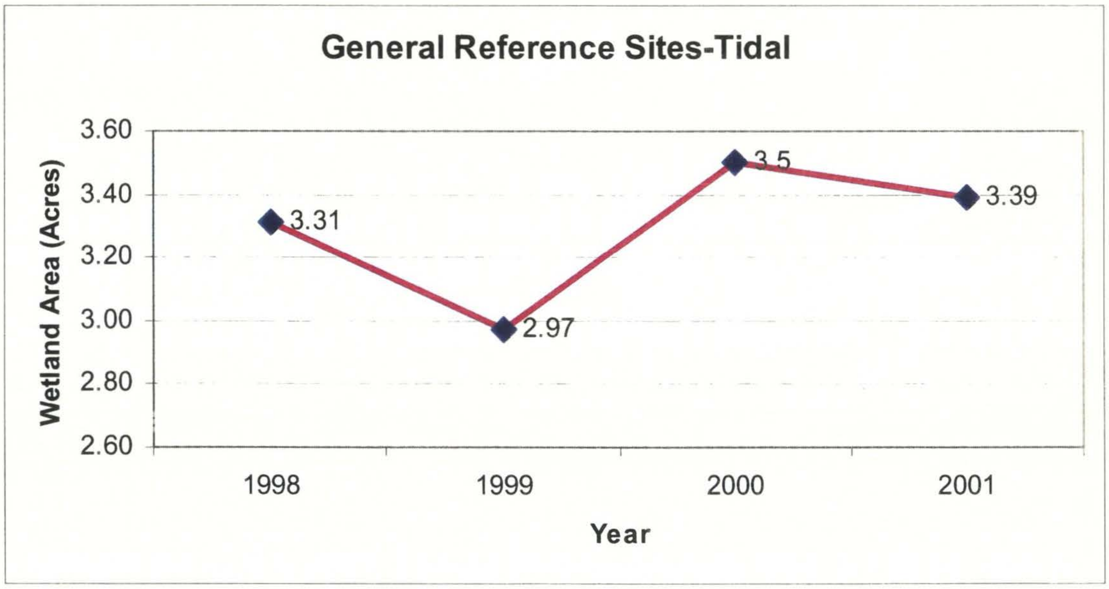


FIGURE 10. Wetland Acreage Through 2001 on Tidal General Reference Sites
Note: 2001 data are incomplete since two of the four sites were removed from study after the 2000 sampling season.

Vegetation Composition

There were three vegetation types present on the nontidal General Reference Sites from 1997 to 2001: Other Native, Cattail, and Nonnative vegetation (Figure 11). Cattail vegetation has been steadily increasing and accounted for most of the total vegetation in 2001. The other two types have fluctuated in acreage, with Nonnative vegetation remaining a small overall component of the vegetation composition.

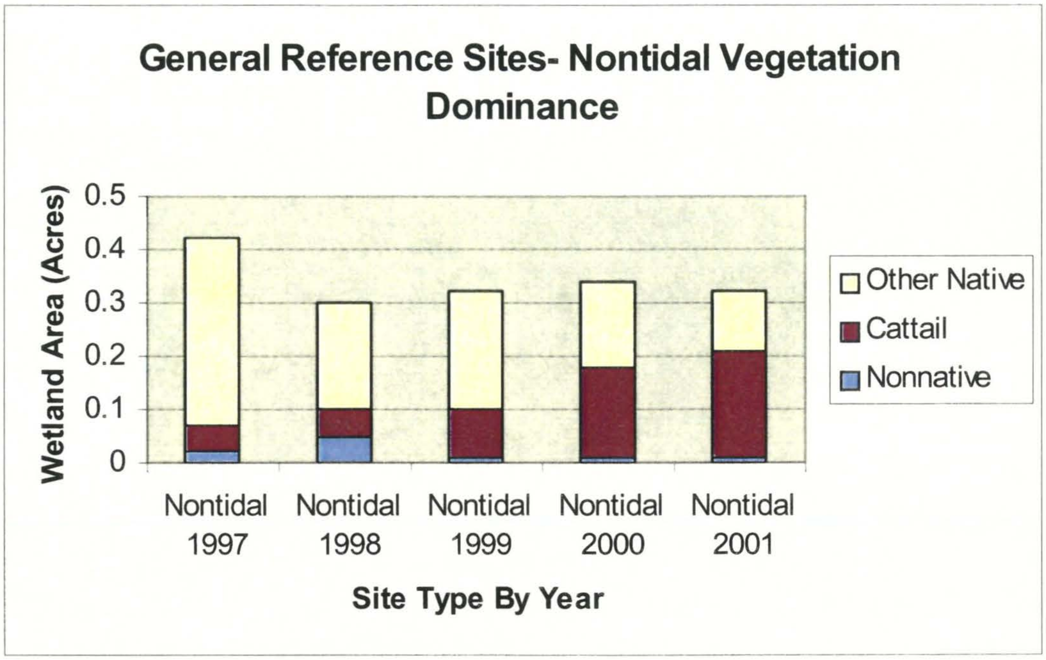


FIGURE 11. Vegetation Dominance Through 2001 in Nontidal General Reference Sites

Vegetation dominance on the tidal sites exhibited a radical change from 1998 to 1999, when the Cattail/bulrush mix type which dominated the Guadalupe River General Reference Site in 1998 was sprayed to eradicate the cattails and the site became dominated by Other Native and a smaller amount of Cattail/bulrush mix vegetation the following year. In 2000, the only vegetation types were Other Native and California Bulrush vegetation. This is reflected in the vegetation dominance graph for the tidal sites (Figure 12). Because the Guadalupe River site is so much larger than any of the other General Reference Sites, fluctuations in vegetation dominance type greatly influence the overall tidal General Reference Site results presented in this study. In 2001 the site continued to experience shifts in vegetation dominance and composition, as Cattail vegetation once again emerged as a dominant type (Figures 12 and 13). In 2001 the Cattail and California Bulrush vegetation were mapped separately rather than as a mixed type since each formed a distinct vegetation type (Figure 13).

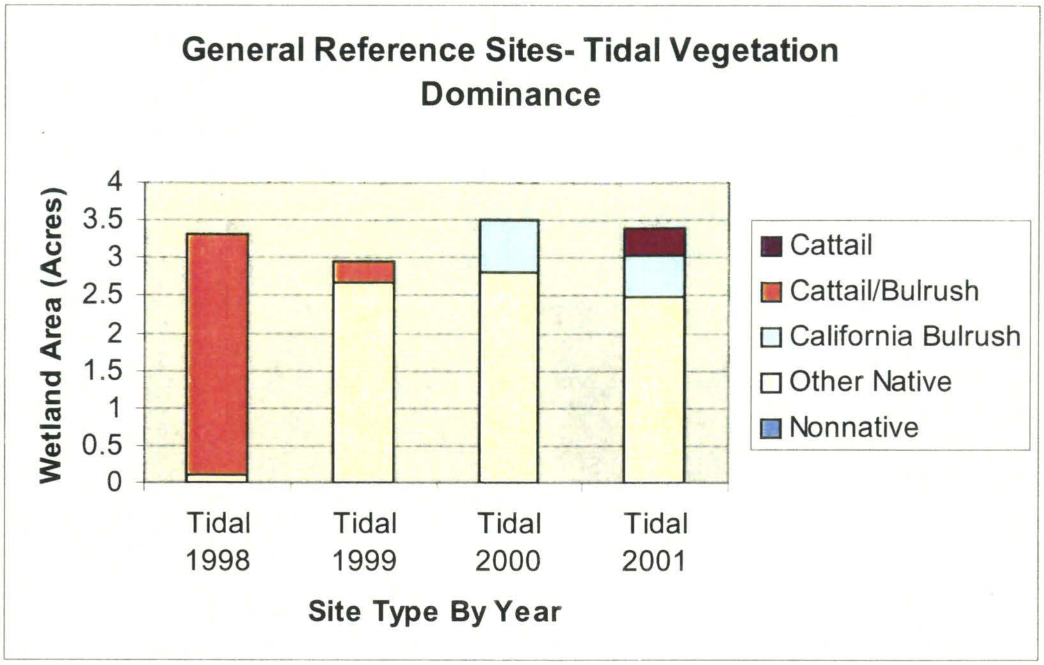
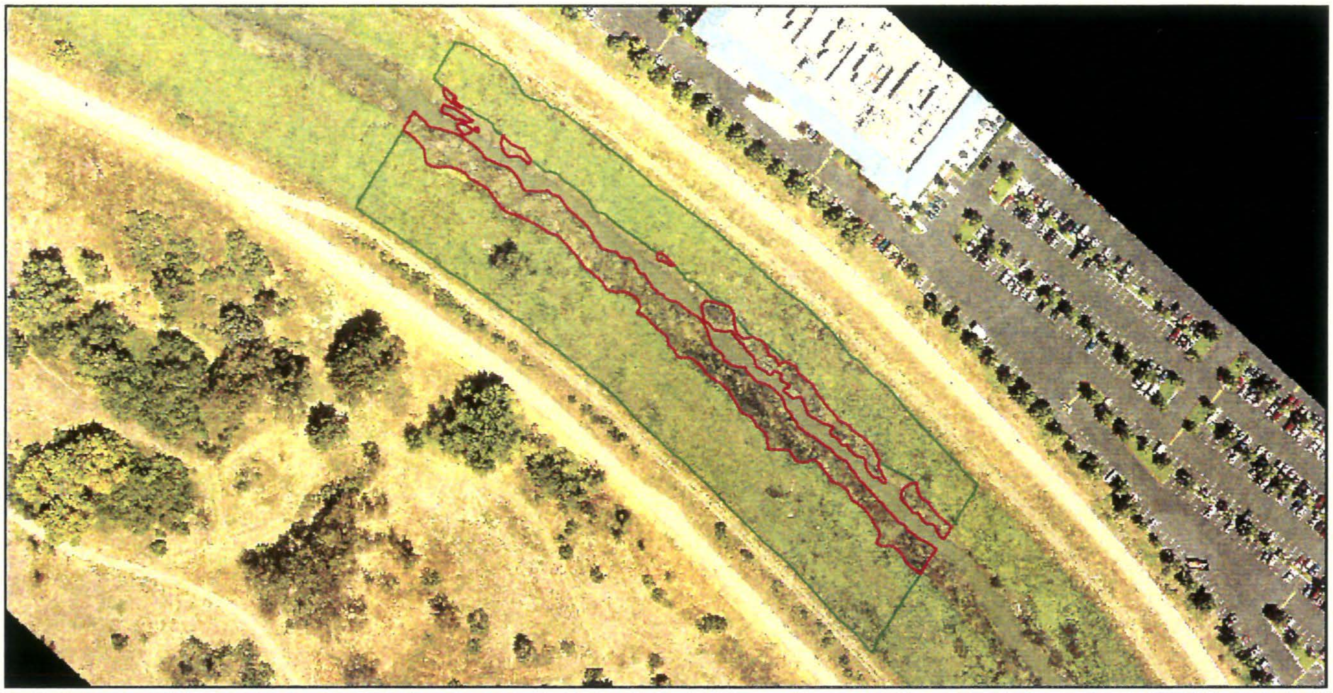
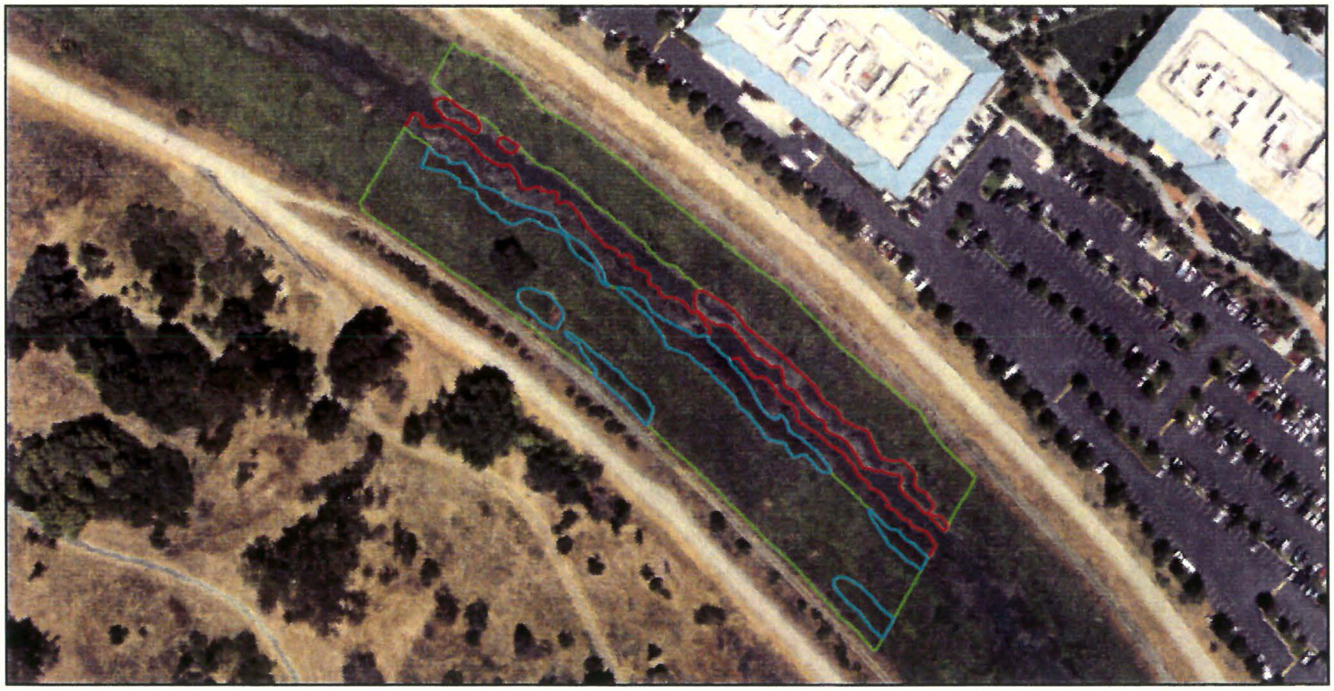


FIGURE 12. Vegetation Dominance Through 2001 in Tidal General Reference Sites. *Note: 1997 data are not included because they are incomplete; however, 2001 are also incomplete since two sites were removed from study prior to the 2001 sampling season.*

Except for a very small amount of Nonnative vegetation mapped in 2000 (0.01 acre), this vegetation type was not present as a dominant type on any of the tidal General Reference Sites during the study period.



A. Photo: August 2000. Field Survey: October 2000.



B. Photo: August 2001. Field Survey: September 2001.

Figure 13. Guadalupe River General Reference Site. Aerial View U/S Tasman Drive; 2001 and 2000.

Wetland Boundary and Vegetation Type

- Other Native
- California Bulrush
- Cattail

N

0 150 300 Feet

Santa Clara Valley Water District

04/16/2002 007431\2001_206\guadalupe1_8x11.mxd

COMPARISON OF 1998 EXCAVATION AND REFERENCE SITES

Percentage increase or decrease comparisons between Excavation, Adjacent Reference, and General Reference Site categories should be viewed as directional trend indicators rather than quantitative certainties. Sizeable differences in overall magnitude of acreage sampled in each category makes strict quantitative comparisons potentially misleading. For example, over five times the acreage of wetland was present in the 1998 Excavation Sites than in the 1998 Adjacent Reference Sites, and a small increase in overall acreage on the Reference Sites resulted in a large increase in percentage growth.

Since 1998, total nontidal wetland amounts either increased or remained almost the same each year until 2001 on all types of sites (Table 12, Figures 3, 7 and 9). All nontidal site types experienced a slight decline in total wetland area in 2001.

There was more wetland vegetation in nontidal excavation and adjacent reference sites every year from 1999-2001 than in 1998 (Table 12, Figures 3, 7). By 2001 the wetlands in these sites were 180% and 280%, respectively, of that present in 1998. The amount in general reference sites was about the same as in 1998 (Figure 9).

The overall acreage pattern for all tidal site categories was similar to that in nontidal sites. However, there was an initial decrease in wetland amount in the excavation sites in the first post-project year (Table 12, Figure 3). Otherwise, wetlands increased each year in all site types, with the exception of the last year in the General Reference Sites (Figures 7 and 10). Year 2001 was a more favorable year for the tidal sites than the nontidal sites, with wetland continuing to expand in the tidal sites even while the nontidal sites experienced a decline (Table 12).

As with the nontidal wetlands, by 2001, tidal wetland amounts in most site categories overall (including 1998 Excavation Sites; Adjacent Reference Sites, collectively; and General Reference Sites) were all in excess of the baseline amounts (ranging between 125% and 190% of the 1998 baseline).

Vegetation Composition

Nontidal Vegetation Dominance

Other Native and Nonnative vegetation types were present on all categories of nontidal sites in almost all years (1998 Excavation, Adjacent Reference, and General Reference Sites) (Figures 4, 8, and 11). Except for the 1998 Excavation Sites, Nonnative vegetation was much less abundant than the other types, and was not present at all on the Adjacent Reference Sites in 2000 and 2001. The sites which did contain notable amounts of nonnative vegetation were those with high benches above the summer water level or with dry stream beds in summer. Nonnative vegetation on these 1998 Excavation Sites increased over time, as did overall wetland amount, until a decline was seen in 2001.

Other Native vegetation amounts remained comparable to or greater than baseline levels on 1998 Excavation Sites and Adjacent Reference Sites over time. Only on General Reference Sites was there any decline in amount of Other Native vegetation. Cattail vegetation showed more variability. After excavation, a reduction in the overall amount of Cattails occurred on 1998 Excavation Sites. There were subsequent annual increases, but cattail amounts remained lower in 2001 compared to 1998. By contrast, Cattail vegetation never decreased, but rather increased (sometimes slightly) over time on General Reference Sites. Cattail was not a typical dominant vegetation type on the 1998 Adjacent Reference Sites, although it was found in a very small amount in 2001.

Tidal Vegetation Dominance

Other Native and erect emergent vegetation (i.e., California Bulrush or Cattail vegetation types) were present on all site category types in all years except 1998 (Figures 4, 8, and 12). Nonnative vegetation was sometimes present. In general, vegetation dominance was more variable on tidal than on nontidal sites.

The amount of nonnative vegetation showed sizeable fluctuations between years in all site categories, in which very little was present. With variable directions from year to year and within vegetation categories, there is no discernable pattern. However, in 2001, all site types had less Nonnative vegetation than in 1998.

Other Native vegetation increased over time in all Site categories (except the General Reference Sites from 200-2001, and the Excavation Sites from 1998-1999). More Other Native vegetation was present in the Excavation Sites and the Adjacent Reference Sites in 2001 than in 1998.

The amount of tall erect emergent vegetation increased overall in the 1998 Excavation Sites and the Reference Sites by 2001. The composition of erect emergent vegetation in all Site categories often shifted dominance or comprised various mixtures from year to year of Cattail/bulrush mix, California bulrush, and Cattail, again without apparent pattern except on the Guadalupe River General Reference Site, in which Cattails were sprayed in 1999, reducing the Cattail/Bulrush mix type, and then began to rebound by 2001 when they formed separate and distinct types.

Other Vegetation Features

During this Study, one or more of the following types of changes commonly occurred on both Excavation and Reference sites:

- Potentially positive shifts in vegetation dominance (e.g., appearance of new native vegetation, disappearance nonnative);
- Potentially neutral shifts in vegetation dominance (e.g., disappearance of one native vegetation type with the appearance of another); and

- Potentially negative shifts in vegetation dominance (e.g., disappearance of native vegetation type, appearance, or increase in amount of nonnative vegetation).
- Slight shifts in vegetation quality indicators within a vegetation dominance type. These usually consisted of increases in total vegetation cover or relative cover of natives.

In 2001 most changes in vegetation quality indicators involved shifts in total relative cover of natives. For the Excavation Sites, these shifts were typically in a positive direction. Shifts, when they occurred, were more variable in the Adjacent Reference Sites.

VEGETATION MANAGEMENT

Vegetation management is a significant component of the District's flood management maintenance program (Appendix H). Most Excavation and Reference Sites in this Study are subject to routine vegetation management. In North County, vegetation management within the stream channels comprises primarily herbicide treatment; in South County, it consists of hand removal of vegetation. The routine type of vegetation management indicated for each Study site, and any deviations known during the duration of the Study, is shown in Appendix I (Mark Wander, personal communication).

Although a reach is indicated for treatment on a routine basis, treatment may or may not be done within a specific reach in any particular year, depending on conditions found. When a reach is treated, the percentage of area treated within the reach also varies depending upon conditions. Aquatic herbicide application and hand removal target woody plants and tall emergent herbs such as Cattails; however, on some sites, lower growing herbaceous vegetation may also be removed.

Vegetation management has been ongoing before and during this Study. In general, aquatic herbicide work is conducted between July1 and October 15 and hand removal is conducted in December. In 1999 through 2001, all vegetation management activities on Study sites were conducted after field assessments; the timing of vegetation management in prior years is not known.

Vegetation changes on at least one site during the course of the study (Guadalupe River General Reference, sprayed in 1998) appear to have resulted from vegetation management actions. Several other sites, including Lower Silver Creek, Sunnyvale West, and Sunnyvale East channels appeared to have been at least partially sprayed or mowed. This Study does not document site-specific vegetation management actions or attempt to interpret effects of the vegetation management program. However, it is important to be aware that all Study data have been collected in the general context of ongoing vegetation management.

STUDY GOALS AND OBJECTIVES AND SUMMARY RESULTS

The purpose of the Wetland Regrowth Study is to better define impacts to instream tidal and nontidal wetlands resulting from the District's sediment removal program. For 3 years each on the 1997 and 1998 sites, the rate of regrowth, extent, and vegetation characteristics of wetland in excavated and non-excavated areas has been studied. Last year's 2000 report contained a summary for the 1997 Sites, while this current year's report (2001) contains a summary for the 1998 Sites.

The third and final year evaluation of the 1998 Excavation Sites indicates substantial regrowth since excavation (178% for nontidal sites and 128% for tidal sites, total regrowth 149%; Table 12). Indeed, both tidal and nontidal total wetland regrowth surpassed excavation by year 2000, two years postproject. For individual sites, only the tidal Sunnyvale East did not show substantial regrowth during the study period (24%; Table 7). Although the amount of nonnative vegetation is high, especially on Berryessa Creek, vegetation dominance types and quality indicators are similar to preproject conditions, and shifts which have occurred have been, for the most part, neutral or positive (such as change from one native vegetation type to another, or small shifts in total cover or native species relative cover).

The rapid and substantial regrowth on almost all 1997 and 1998 Excavation Study Sites indicates that instream wetland vegetation can and does recover from sediment removal activities. We have seen that regrowth was substantially slower on some tidal sites compared to other tidal sites and to all nontidal sites. In the 5 years that this Study has been conducted, we have also analyzed trends of vegetation dynamics and documented characteristics of regrowth. We observed that a higher incidence of nonnative species often coincided with higher-elevation, drier sediment bars that accumulate in the channels. In addition, we have determined that a reduction in Cattail amounts may occur after nontidal excavation, but that for the most part, changes in vegetation dominance and quality have been either neutral or positive and that similar vegetation fluctuations also occurred on reference sites. Although it was not a purpose of this Study to examine the effects of the District's vegetation management program on vegetation composition, we have seen indications of dominance shifts in vegetation from one type to another that may have resulted from this program.

REFERENCES

Bonham, C. 1989. Measurement for Terrestrial Vegetation. John Wiley and Sons, New York.

Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Hickman, L. R., ed. 1993. The Jepson Manual: Higher Plants of California. University of California Press, Berkeley, CA.

H.T. Harvey and Associates. 1997. Lower Guadalupe River Santa Clara County Identification of Waters of the U.S. Alviso, CA.

Mueller-Dombois, D. and H. Ellenberg. 1975. Aims and Methods of Vegetation Ecology. John Wiley and Sons, New York.

Rankin, G. and J. Hillman. 1999. Santa Clara Valley Water District Instream Wetland Vegetation Regrowth Study First Annual Report: Results for 1998. Santa Clara Valley Water District. San Jose, CA.

Rankin, G. and J. Hillman. 2000. Santa Clara Valley Water District Instream Wetland Vegetation Regrowth Study Second Annual Report: Results for 1999. Santa Clara Valley Water District. San Jose, CA.

Rankin, G. and J. Hillman. 2001. Santa Clara Valley Water District Instream Wetland Vegetation Regrowth Study Third Annual Report. Results for 2000. Santa Clara Valley Water District. San Jose, CA.

Reed, P. 1988. National List of Plant Species that Occur in Wetlands: California (Region 0). U.S. Fish and Wildlife Service Biological Report 88 (26.10).

Santa Clara Valley Water District. 1998. Santa Clara Valley Water District 1998 Stream Maintenance Project Final Initial Study and Negative Declaration. San Jose, CA.

Soil Conservation Service. 1968. Soils of Santa Clara County, California. USDA.

Soil Conservation Service. 1992. Hydric Soils in Santa Clara Area. USDA.

Thomas Reid Associates (TRA). 1995. Application for the Department of the Army Permit (33 CFR 325) Additional Information. Prepared for the Santa Clara Valley Water District. Palo Alto, CA.

Thomas Reid Associates (TRA). 1997. Santa Clara Valley Water District Urgent Sediment Removal Project Final Initial Study and Mitigated Negative Declaration. Palo Alto, CA.

Wander, Mark. Special Projects Unit, Santa Clara Valley Water District. Personal Communication.

APPENDIX A
Study Plant List

Wetland Vegetation Regrowth Study Plant List for 2001

Family Name	Species	Common Name	Wetland Indicator Status [1, 2]	Origin[3]
AMARANTHACEAE	*Amaranthus deflexus*	Low Amaranth	NOL	E
	Amaranthus powellii	Powell's Amaranth	NOL	E
APIACEAE	*Conium maculatum*	Poison Hemlock	FACW	E
	Foeniculum vulgare	Fennel	FACU	E
ASTERACEAE	*Artemisia douglasiana*	Mugwort	FACW	N
	Aster chilensis	Common California Aster	FAC	N
	Aster subulatus var. ligulatus	Slim Aster	FACW	N
	Baccharis douglasii	Marsh Baccharis	OBL	N
	Bidens frondosa	Sticktight	FACW	N
	Cirsium vulgare	Bull Thistle	FACU	E
	Conyza canadensis	Horseweed	FAC	N
	Euthamia occidentalis	Western Goldenrod	OBL	N
	Gnaphalium luteo-album	Weedy Cudweed	FACW-	E
	Lactuca serriola	Prickly Lettuce	FAC	E
	Picris echioides	Bristly Ox-Tongue	FAC	E
	Xanthium strumarium	Cocklebur	FAC+	E
BORAGINACEAE	*Heliotropium currassavicum*	Heliotrope	OBL	N
BRASSICACEAE	*Brassica nigra*	Black Mustard	UPL	E
	Lepidium latifolium	Broad-Leaf Peppergrass	FACW	I
	Raphanus sativus	Wild Radish	UPL	E
	Rorippa nasturtium-aquaticum	Watercress	OBL	N
CHENOPODIACEAE	*Atriplex triangularis*	Spearscale	FACW	N
	Chenopodium ambrosioides	Mexican Tea	FAC	E
	Chenopodium album	Lamb's Quarters	FAC	E
CYPERACEAE	*Cyperus eragrostis*	Tall Cyperus	FACW	N
	Cyperus esculentus	Yellow Nutgrass	FACW	N
	Cyperus involucratus	Umbrella Nutsedge	OBL	E
	Scirpus pungens	Common Threesquare	OBL	N
	Scirpus robustus	Alkali Bulrush	OBL	N
	Scirpus maritimus	Bulrush	OBL	N
	Scirpus californicus	California Bulrush	OBL	N
EQUISETACEAE	*Equisetum arvense*	Common Horsetail	FAC	N
FABACEAE	*Lotus corniculatus*	Birdfoot Trefoil	FAC	E
	Melilotus alba	White Sweetclover	FACU+	E
JUNCACEAE	*Juncus patens*	Spreading Rush	FAC	N
	Juncus phaocephalus	Brown-Headed Rush	FACW	N
	Juncus xiphioides	Iris-Leaved Rush	OBL	N
LAMIACEAE	*Mellisa officinalis*	Bee Balm	NOL	E
	Mentha x piperita	Peppermint	OBL	E
	Mentha arvensis	Field Mint	FACW	E
	Mentha spicata	Spearmint	OBL	E
LYTHRACEAE	*Lythrum hyssopifolia*	Hyssop Loosestrife	FACW	E
MALVACEAE	*Malva sp.*	Mallow	NOL	E
ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	Common Willow-Herb	FACW	N
	Epilobium sp.	Willow-Herb	NOL	N
	Ludwigia peploides ssp. peploides	Yellow Water Primrose	OBL	N
PLATANACEAE	*Platanus racemosa*	Western Sycamore	FACW	N
POACEAE	*Agrostis viridis*	Water Bent Grass	OBL	E
	Bromus catharticus	Rescue Grass	NOL	E
	Cynodon dactylon	Bermuda Grass	FAC	E
	Digitaria sanguinalis	Crab Grass	FACU	E
	Echinochloa crus-galli	Barnyard Grass	FACW	E
	Leersia oryzoides	Rice Cutgrass	OBL	N

Wetland Vegetation Regrowth Study Plant List for 2001 (Continued)

Family Name	Species	Common Name	Wetland Indicator Status [1, 2]	Origin[3]
POACEAE	*Leptochloa fascicularis*	Bearded Sprangletop	OBL	N
	Lolium multiflorum	Italian Ryegrass	NOL	E
	Paspalum dilatatum	Dallis Grass	FAC	E
	Paspalum distichum	Knot Grass	OBL	N
	Phalaris aquatica	Harding Grass	FAC+	E
	Piptatherum miliaceum	Smilo Grass	NOL	E
	Polypogon interruptus	Ditch Beard Grass	OBL	E
	Polypogon monspeliensis	Annual Beard Grass	FACW+	E
	Setaria pumila	Setaria	NOL	E
	Sorghum bicolor	Sudan Grass	FAC	E
POLYGONACEAE	*Polygonum persicaria*	Lady's Thumb	FACW	E
	Polygonum amphibium var. emersum	Water Smartweed	OBL	N
	Polygonum punctatum	Water Smartweed	OBL	N
	Polygonum lapathifolium	Willow Weed	OBL	N
	Polygonum spp.	Smartweed	NOL	N
	Rumex crispus	Curly Dock	FACW-	E
PORTULACACEAE	*Portulaca oleracea*	Common Purslane	FAC	E
ROSACEAE	*Rubus discolor*	Himalayan Blackberry	FACW	E
	Rubus parviflorus	Thimbleberry	FAC+	N
SALICACEAE	*Populus fremontii*	Fremont Cottonwood	FACW	N
	Salix laevigata	Red Willow	NOL	N
	Salix sp.	Willow	NOL	N
	Salix lasiolepis	Arroyo Willow	FACW	N
	Salix lucida ssp. lasiandra	Yellow Willow	OBL	N
SCROPHULARIACEA	*Veronica anagallis-aquatica*	Water Speedwell	OBL	E
TYPHACEAE	*Typha angustifolia*	Narrow-Leaved Cattail	OBL	N
	Typha latifolia	Broad-Leaved Cattail	OBL	N
	Typha sp.	Cattail	OBL	N
	Typha spp.	Cattails-various	NOL	N
URTICACEAE	*Urtica dioica ssp. holosericea*	Hoary Nettle	FACW	N

[1] (Reed, 1998)

[2] WETLAND INDICATOR CATEGORY (PROBABILITY OF OCCURENCES IN WETLANDS):
Obligate (>99%), Facultative Wetland (67-99%), Facultative (34-66%), Facultative Upland (1-33%), Upland (<1%).
Not On List- NOL, NI- No Indicator Status Given

[3] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

APPENDIX B
1998 Excavation Site Checklists

SCVWD Wetland Assessment Checklist

Facility Name: Berryessa Creek
Location: from Calaveras Blvd to Lower Penitencia Crk

Survey Start Date: 10/2/2001
Survey End Date: 10/3/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Tidal or Nontidal: Mixed
If nontidal, is water in channel?:

Investigator: Janell Hillman
Station # Start: 0
Station # End: 8600

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 37

Vegetation Type: tidal type 1 of 4: cattail

Dominance (>50% Relative Cover): Tidal: cattail

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	51-75%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

The tidal section of the study site on Berryessa Creek contained four wetland vegetation types. Type 1 was dominated by high stature emergent native wetland throughout the site along the low flow channel. Type 2 was dominated by low-growing herbaceous native vegetation in and along the low flow channel. Type 3 was dominated by exotics and was located on low benches above the low flow channel at the upper wetland boundary, while Type 4 was dominated by perennial emergent native vegetation located primarily at the downstream end of the sample site. Type 4 is the most recently established vegetation type and was not called out last year as a separate type.

Vegetation type 1 was dominated by Typha latifolia (>50% relative cover). Cattails grew along the edge of the low flow channel throughout the site. Typha angustifolia was also present, but at low density. Total cover was thick (100%). Native species relative cover was within the 51-75% relative cover category. The invasive Lepidium latifolium was found at the upper boundary of the vegetation type but occurred mostly in the upland (less than 5% relative cover in the wetland).

Estimated Wetland Amount: 0.76 ac

Code: 131

SCVWD Wetlands Plant List

Facility Name:	Berryessa Creek	**Survey Start Date:**	10/2/2001
Location:	from Calaveras Blvd to Lower Penitencia Crk	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Vegetation Type: tidal type 1 of 4: cattail

Relative Cover	Family	Species	Wetland Indicator Status	Origin [1]
>50%	TYPHACEAE	*Typha latifolia*	OBL	N
<20%	APIACEAE	*Foeniculum vulgare*	FACU	E
	ASTERACEAE	*Artemisia douglasiana*	FACW	N
	ASTERACEAE	*Baccharis douglasii*	OBL	N
	ASTERACEAE	*Picris echioides*	FAC	E
	ASTERACEAE	*Bidens frondosa*	FACW	N
	ASTERACEAE	*Xanthium strumarium*	FAC+	E
	ASTERACEAE	*Aster subulatus var. ligulatus*	FACW	N
	BRASSICACEAE	*Lepidium latifolium*	FACW	I
	CHENOPODIACEAE	*Atriplex triangularis*	FACW	N
	CYPERACEAE	*Scirpus californicus*	OBL	N
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	LAMIACEAE	*Mellisa officinalis*	NOL	E
	LYTHRACEAE	*Lythrum hyssopifolia*	FACW	E
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
	PLATANACEAE	*Platanus racemosa*	FACW	N
	POACEAE	*Cynodon dactylon*	FAC	E
	POACEAE	*Paspalum distichum*	OBL	N
	POACEAE	*Leptochloa fascicularis*	OBL	N
	POLYGONACEAE	*Polygonum lapathifolium*	OBL	N
	POLYGONACEAE	*Polygonum persicaria*	FACW	E
	POLYGONACEAE	*Polygonum punctatum*	OBL	N
	SALICACEAE	*Salix laevigata*	NOL	N
	TYPHACEAE	*Typha angustifolia*	OBL	N
	URTICACEAE	*Urtica dioica ssp. holosericea*	FACW	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 131

SCVWD Wetland Assessment Checklist

Facility Name: Berryessa Creek
Location: from Calaveras Blvd to Lower Penitencia Crk

Survey Start Date: 10/2/2001
Survey End Date: 10/3/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Tidal or Nontidal: Mixed
If nontidal, is water in channel?:

Investigator: Janell Hillman
Station # Start: 0
Station # End: 8600

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 37

Vegetation Type: tidal type 2 of 4: water primrose

Dominance (>50% Relative Cover): Tidal: other native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 2 of 4 was dominated by Ludwigia peploides (>50% relative cover). This type grew mainly within the low flow channel or at the edges of the low flow channel. Total cover was within the 76-100% category. Native species relative cover was also within the 76-100% category. There were no invasive species found in this vegetation type.

Estimated Wetland Amount: 0.34 ac

Code: 131

SCVWD Wetlands Plant List

Facility Name:	Berryessa Creek	**Survey Start Date:**	10/2/2001
Location:	from Calaveras Blvd to Lower Penitencia Crk	**Investigator:**	Janell Hillman

Survey Chronology:	Post-Project Survey- 3rd Year
Site Type:	RS, Excavation Study Site
Vegetation Type:	tidal type 2 of 4: water primrose

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
<20%	APIACEAE	*Foeniculum vulgare*	FACU	E
	ASTERACEAE	*Artemisia douglasiana*	FACW	N
	ASTERACEAE	*Picris echioides*	FAC	E
	ASTERACEAE	*Bidens frondosa*	FACW	N
	ASTERACEAE	*Aster subulatus var. ligulatus*	FACW	N
	BRASSICACEAE	*Lepidium latifolium*	FACW	I
	CHENOPODIACEAE	*Atriplex triangularis*	FACW	N
	CYPERACEAE	*Scirpus californicus*	OBL	N
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	EQUISETACEAE	*Equisetum arvense*	FAC	N
	LAMIACEAE	*Mentha arvensis*	FACW	E
	LYTHRACEAE	*Lythrum hyssopifolia*	FACW	E
	MALVACEAE	*Malva sp.*	NOL	E
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	POACEAE	*Phalaris aquatica*	FAC+	E
	POACEAE	*Echinochloa crus-galli*	FACW	E
	POACEAE	*Paspalum distichum*	OBL	N
	POLYGONACEAE	*Rumex crispus*	FACW-	E
	POLYGONACEAE	*Polygonum lapathifolium*	OBL	N
	POLYGONACEAE	*Polygonum persicaria*	FACW	E
	POLYGONACEAE	*Polygonum punctatum*	OBL	N
	SALICACEAE	*Salix laevigata*	NOL	N
	SALICACEAE	*Salix lasiolepis*	FACW	N
	TYPHACEAE	*Typha latifolia*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 131

SCVWD Wetland Assessment Checklist

Facility Name: Berryessa Creek
Location: from Calaveras Blvd to Lower Penitencia Crk

Survey Start Date: 10/2/2001
Survey End Date: 10/3/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Tidal or Nontidal: Mixed
If nontidal, is water in channel?:

Investigator: Janell Hillman
Station # Start: 0
Station # End: 8600

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 37

Vegetation Type: tidal type 3 of 4: nonnative

Dominance (>50% Relative Cover): Tidal: non-native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	26-50%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 3 of 4 was dominated by a mix of weedy species, but with some natives. Picris echioides and Echinochloa crus-galli were co-dominant (each with 20-50% relative cover). Other common species included Lythrum hyssopifolia, Polygonum persicaria, and Epilobium ciliatum. This type was found on low benches above the low flow channel at the upper wetland boundary, mainly along the left bank (looking upstream). Total cover was thick (100%). Native species relative cover was at the high end of 20-50% relative cover category. Invasive species relative cover was less than 5%.

Estimated Wetland Amount: 0.72 ac

Code: 131

SCVWD Wetlands Plant List

Facility Name:	Berryessa Creek	**Survey Start Date:**	10/2/2001
Location:	from Calaveras Blvd to Lower Penitencia Crk	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Vegetation Type: tidal type 3 of 4: nonnative

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
=20-50%	ASTERACEAE	*Picris echioides*	FAC	E
	POACEAE	*Echinochloa crus-galli*	FACW	E
<20%	APIACEAE	*Conium maculatum*	FACW	E
	ASTERACEAE	*Conyza canadensis*	FAC	N
	ASTERACEAE	*Bidens frondosa*	FACW	N
	ASTERACEAE	*Xanthium strumarium*	FAC+	E
	ASTERACEAE	*Aster subulatus var. ligulatus*	FACW	N
	BRASSICACEAE	*Lepidium latifolium*	FACW	I
	BRASSICACEAE	*Brassica nigra*	UPL	E
	CYPERACEAE	*Scirpus californicus*	OBL	N
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	EQUISETACEAE	*Equisetum arvense*	FAC	N
	FABACEAE	*Melilotus alba*	FACU+	E
	LYTHRACEAE	*Lythrum hyssopifolia*	FACW	E
	MALVACEAE	*Malva sp.*	NOL	E
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	POACEAE	*Bromus catharticus*	NOL	E
	POACEAE	*Cynodon dactylon*	FAC	E
	POACEAE	*Polypogon monspeliensis*	FACW+	E
	POACEAE	*Lolium multiflorum*	NOL	E
	POACEAE	*Agrostis viridis*	OBL	E
	POLYGONACEAE	*Rumex crispus*	FACW-	E
	TYPHACEAE	*Typha latifolia*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 131

SCVWD Wetland Assessment Checklist

Facility Name: Berryessa Creek
Location: from Calaveras Blvd to Lower Penitencia Crk

Survey Start Date: 10/2/2001
Survey End Date: 10/3/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Tidal or Nontidal: Mixed
If nontidal, is water in channel?:

Investigator: Janell Hillman
Station # Start: 0
Station # End: 8600

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 37

Vegetation Type: tidal type 4 of 4: bulrush .

Dominance (>50% Relative Cover): Tidal: California bulrush

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 4 of 4 was located at the downstream end of the sample site, along the low flow channel. Dominant cover was provided by Scirpus californicus (>50% relative cover). The bulrush grew in scattered clumps that were becoming well-established this year (not called out as a separate type last year). Total cover was thick (100%) and native (very close to 100% cover due to lack of species diversity and proximity to the low flow channel). This type was fairly monospecific. The invasive Lepdium latifolium was present but occurred only occasionally where this type met the upland boundary.

Estimated Wetland Amount: 0.09 ac

Code: 131

SCVWD Wetlands Plant List

Facility Name:	Berryessa Creek	**Survey Start Date:**	10/2/2001
Location:	from Calaveras Blvd to Lower Penitencia Crk	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Vegetation Type: tidal type 4 of 4: bulrush

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	CYPERACEAE	*Scirpus californicus*	OBL	N
<20%	ASTERACEAE	*Picris echioides*	FAC	E
	ASTERACEAE	*Bidens frondosa*	FACW	N
	BRASSICACEAE	*Lepidium latifolium*	FACW	I
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	LYTHRACEAE	*Lythrum hyssopifolia*	FACW	E
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
	POACEAE	*Paspalum distichum*	OBL	N
	POLYGONACEAE	*Polygonum persicaria*	FACW	E
	POLYGONACEAE	*Polygonum punctatum*	OBL	N
	TYPHACEAE	*Typha latifolia*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 131

SCVWD Wetland Assessment Checklist

Facility Name:	Berryessa Creek	**Survey Start Date:**	8/23/2001
Location:	from Calaveras Blvd to Lower Penitencia Crk	**Survey End Date:**	9/28/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Tidal or Nontidal: Mixed
If nontidal, is water in channel?: Yes

Investigator: Janell Hillman
Station # Start: 0
Station # End: 8600

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 31J

Vegetation Type: Nontidal, Type 1 of 6: Ludwigia

Dominance (>50% Relative Cover): NonTidal: other native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

The nontidal section of Berryessa Creek contained a mix of six wetland vegetation types. These types existed for the most part in a very patchy mosaic pattern with varying topographic features. Soil was moist or saturated in all types. Species composition was similar across types; in general, what distinguished them was the relative abundance or extent of the dominant species.

Vegetation type 1 of 6 occurred along the low flow channel. It was dominated by Ludwigia peploides (>50% relative cover). Also common were Polygonum spp. and Rorippa nastirtium-aquaticum (each with cover around 20%). Total cover was thick (100%) and native (76-100% category). This type typically occurred at lowest elevation in and along the low flow channel, which had flowing water adjacent to and under the vegetation.

Estimated Wetland Amount: 1.64 ac

Code: 117

SCVWD Wetlands Plant List

Facility Name:	Berryessa Creek	**Survey Start Date:**	8/23/2001
Location:	from Calaveras Blvd to Lower Penitencia Crk	**Investigator:**	Janell Hillman

Survey Chronology:	Post-Project Survey- 3rd Year
Site Type:	RS, Excavation Study Site
Vegetation Type:	Nontidal, Type 1 of 6: Ludwigia

Relative Cover	Family	Species	Wetland Indicator Status	Origin [1]
>50%	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
=20-50%	BRASSICACEAE	*Rorippa nasturtium-aquaticum*	OBL	N
	POLYGONACEAE	*Polygonum spp.*	NOL	N
<20%	ASTERACEAE	*Picris echioides*	FAC	E
	ASTERACEAE	*Xanthium strumarium*	FAC+	E
	ASTERACEAE	*Aster subulatus var. ligulatus*	FACW	N
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	LYTHRACEAE	*Lythrum hyssopifolia*	FACW	E
	POACEAE	*Echinochloa crus-galli*	FACW	E
	POACEAE	*Paspalum distichum*	OBL	N
	POACEAE	*Leptochloa fascicularis*	OBL	N
	POACEAE	*Polypogon monspeliensis*	FACW+	E
	POLYGONACEAE	*Polygonum lapathifolium*	OBL	N
	POLYGONACEAE	*Polygonum persicaria*	FACW	E
	POLYGONACEAE	*Polygonum punctatum*	OBL	N
	SALICACEAE	*Populus fremontii*	FACW	N
	SCROPHULARIACEAE	*Veronica anagallis-aquatica*	OBL	E
	TYPHACEAE	*Typha sp.*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 117

SCVWD Wetland Assessment Checklist

Facility Name: Berryessa Creek
Location: from Calaveras Blvd to Lower Penitencia Crk

Survey Start Date: 8/23/2001
Survey End Date: 9/28/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Tidal or Nontidal: Mixed
If nontidal, is water in channel?: Yes

Investigator: Janell Hillman
Station # Start: 0
Station # End: 8600

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 31J

Vegetation Type:
Nontidal, Type 2 of 6: Typha

Dominance (>50% Relative Cover):
NonTidal: bulrush, cattail, burreed or mix

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 2 of 6 was located adjacent to type 1 in the low flow channel. It was dominated by Typha spp., Typha angustifolia and T. latifolia (20-50% relative cover of each). Total cover was thick (100%). Native species relative cover was at the lower end of the 76-100% category. Native cover was higher at the upstream end of the sample site. Downstream of Milpitas Blvd the stands of cattail contained more mixed exotics.

Estimated Wetland Amount:
0.90 ac

Code: 117

SCVWD Wetlands Plant List

Facility Name:	Berryessa Creek	**Survey Start Date:**	8/23/2001
Location:	from Calaveras Blvd to Lower Penitencia Crk	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Vegetation Type: Nontidal, Type 2 of 6: Typha

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
=20-50%	TYPHACEAE	*Typha angustifolia*	OBL	N
	TYPHACEAE	*Typha latifolia*	OBL	N
<20%	POLYGONACEAE	*Polygonum persicaria*	FACW	E
	POLYGONACEAE	*Polygonum punctatum*	OBL	N
	SALICACEAE	*Populus fremontii*	FACW	N
	SALICACEAE	*Salix lasiolepis*	FACW	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 117

SCVWD Wetland Assessment Checklist

Facility Name: Berryessa Creek
Location: from Calaveras Blvd to Lower Penitencia Crk

Survey Start Date: 8/23/2001
Survey End Date: 9/28/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Tidal or Nontidal: Mixed
If nontidal, is water in channel?: Yes

Investigator: Janell Hillman
Station # Start: 0
Station # End: 8600

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 31J

Vegetation Type:
Nontidal, Type 3 of 6: Equisetum

Dominance (>50% Relative Cover):
NonTidal: other native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	51-75%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 3 of 6 was located on higher, thickly vegetated (100% cover) berms above the low flow channel, mostly along the right bank (looking upstream). Soil was very sandy and moist. This type was more weedy than vegetation type 1 or 2 but still had a high cover of natives (51-75% relative cover), mainly due to Equisetum arvense which was the dominant species (>50% relative cover). Total cover was extremely thick and layered.

Estimated Wetland Amount:
0.37 ac

Code: 117

SCVWD Wetlands Plant List

Facility Name:	Berryessa Creek	**Survey Start Date:**	8/23/2001
Location:	from Calaveras Blvd to Lower Penitencia Crk	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Vegetation Type: Nontidal, Type 3 of 6: Equisetum

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	EQUISETACEAE	*Equisetum arvense*	FAC	N
<20%	APIACEAE	*Foeniculum vulgare*	FACU	E
	ASTERACEAE	*Picris echioides*	FAC	E
	ASTERACEAE	*Xanthium strumarium*	FAC+	E
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	CYPERACEAE	*Cyperus involucratus*	OBL	E
	LYTHRACEAE	*Lythrum hyssopifolia*	FACW	E
	POACEAE	*Phalaris aquatica*	FAC+	E
	POACEAE	*Cynodon dactylon*	FAC	E
	POACEAE	*Paspalum distichum*	OBL	N
	SALICACEAE	*Populus fremontii*	FACW	N
	SALICACEAE	*Salix lasiolepis*	FACW	N
	TYPHACEAE	*Typha angustifolia*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 117

SCVWD Wetland Assessment Checklist

Facility Name: Berryessa Creek
Location: from Calaveras Blvd to Lower Penitencia Crk

Survey Start Date: 8/23/2001
Survey End Date: 9/28/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Tidal or Nontidal: Mixed
If nontidal, is water in channel?: Yes

Investigator: Janell Hillman
Station # Start: 0
Station # End: 8600

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 31J

Vegetation Type: Nontidal, Type 4 of 6: weedy mix

Dominance (>50% Relative Cover): NonTidal: non-native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	26-50%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 4 of 6 occurred on higher-elevation berms above the low flow channel. It was dominated by Picris echioides (>50% relative cover) and Cynodon dactylon (20-50% relative cover). Soil was moist and contained more silt than vegetation type 3. Total cover was thick (100%) and mostly nonnative (native species relative cover was within the 26-50% category). Species dominance fluctuated in various locations, but mainly was composed of the same exotic annuals. There were no invasive species present. This type was common and could be found continuously throughout the entire nontidal portion of the sample site.

Estimated Wetland Amount: 1.63 ac

Code: 117

SCVWD Wetlands Plant List

Facility Name:	Berryessa Creek	**Survey Start Date:**	8/23/2001
Location:	from Calaveras Blvd to Lower Penitencia Crk	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Vegetation Type: Nontidal, Type 4 of 6: weedy mix

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	ASTERACEAE	*Picris echioides*	FAC	E
=20-50%	POACEAE	*Cynodon dactylon*	FAC	E
<20%	APIACEAE	*Conium maculatum*	FACW	E
	APIACEAE	*Foeniculum vulgare*	FACU	E
	ASTERACEAE	*Conyza canadensis*	FAC	N
	ASTERACEAE	*Bidens frondosa*	FACW	N
	ASTERACEAE	*Lactuca serriola*	FAC	E
	ASTERACEAE	*Xanthium strumarium*	FAC+	E
	ASTERACEAE	*Cirsium vulgare*	FACU	E
	BRASSICACEAE	*Raphanus sativus*	UPL	E
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	EQUISETACEAE	*Equisetum arvense*	FAC	N
	FABACEAE	*Lotus corniculatus*	FAC	E
	LAMIACEAE	*Mentha spicata*	OBL	E
	LYTHRACEAE	*Lythrum hyssopifolia*	FACW	E
	MALVACEAE	*Malva sp.*	NOL	E
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	POACEAE	*Bromus catharticus*	NOL	E
	POACEAE	*Echinochloa crus-galli*	FACW	E
	POACEAE	*Paspalum dilatatum*	FAC	E
	POACEAE	*Paspalum distichum*	OBL	N
	POACEAE	*Piptatherum miliaceum*	NOL	E
	POACEAE	*Polypogon monspeliensis*	FACW+	E
	POACEAE	*Agrostis viridis*	OBL	E
	POLYGONACEAE	*Rumex crispus*	FACW-	E
	POLYGONACEAE	*Polygonum lapathifolium*	OBL	N
	SALICACEAE	*Salix laevigata*	NOL	N
	TYPHACEAE	*Typha angustifolia*	OBL	N
	TYPHACEAE	*Typha latifolia*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 117

SCVWD Wetland Assessment Checklist

Facility Name: Berryessa Creek
Location: from Calaveras Blvd to Lower Penitencia Crk

Survey Start Date: 8/23/2001
Survey End Date: 9/28/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Tidal or Nontidal: Mixed
If nontidal, is water in channel?: Yes

Investigator: Janell Hillman
Station # Start: 0
Station # End: 8600

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 31J

Vegetation Type: Nontidal, Type 5 of 6: Xanthium

Dominance (>50% Relative Cover): NonTidal: non-native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	26-50%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 5 of 5 occurred on the highest elevation berms above the low flow channel. It was dominated by Xanthium strumarium (>50% relative cover). The species composition was similar to vegetation type 4. Soil was very moist and silty like type 4. This vegetation type was typically found near the center of the channel, above the low flow channel at high elevation.

Estimated Wetland Amount: 0.01 ac

Code: 117

SCVWD Wetlands Plant List

Facility Name:	Berryessa Creek	**Survey Start Date:**	8/23/2001
Location:	from Calaveras Blvd to Lower Penitencia Crk	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Vegetation Type: Nontidal, Type 5 of 6: Xanthium

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	ASTERACEAE	*Xanthium strumarium*	FAC+	E
<20%	APIACEAE	*Conium maculatum*	FACW	E
	APIACEAE	*Foeniculum vulgare*	FACU	E
	ASTERACEAE	*Conyza canadensis*	FAC	N
	ASTERACEAE	*Picris echioides*	FAC	E
	ASTERACEAE	*Lactuca serriola*	FAC	E
	ASTERACEAE	*Cirsium vulgare*	FACU	E
	BRASSICACEAE	*Raphanus sativus*	UPL	E
	CHENOPODIACEAE	*Atriplex triangularis*	FACW	N
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	EQUISETACEAE	*Equisetum arvense*	FAC	N
	LAMIACEAE	*Mentha spicata*	OBL	E
	LYTHRACEAE	*Lythrum hyssopifolia*	FACW	E
	MALVACEAE	*Malva sp.*	NOL	E
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	POACEAE	*Bromus catharticus*	NOL	E
	POACEAE	*Echinochloa crus-galli*	FACW	E
	POACEAE	*Cynodon dactylon*	FAC	E
	POACEAE	*Paspalum dilatatum*	FAC	E
	POACEAE	*Piptatherum miliaceum*	NOL	E
	POACEAE	*Polypogon monspeliensis*	FACW+	E
	POACEAE	*Agrostis viridis*	OBL	E
	POLYGONACEAE	*Rumex crispus*	FACW-	E
	SALICACEAE	*Salix laevigata*	NOL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 117

SCVWD Wetland Assessment Checklist

Facility Name: Berryessa Creek
Location: from Calaveras Blvd to Lower Penitencia Crk

Survey Start Date: 8/23/2001
Survey End Date: 9/28/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Tidal or Nontidal: Mixed
If nontidal, is water in channel?: Yes

Investigator: Janell Hillman
Station # Start: 0
Station # End: 8600

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 31J

Vegetation Type: Vegetation Type 6 of 6

Dominance (>50% Relative Cover): NonTidal: other native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	51-75%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 6 of 6 was found downstream of Milpitas Blvd. It occurred on low bars above the low flow channel, and was dominated by a mixture of species such as Picris echioides, Typha spp., and Cyperus eragrostis (each co-dominant with 20-50% relative cover). This type was intermediary between types 2 and 4. It was weedier than type 2 but contained a higher native species cover and was more diverse than type 4. Total cover was 100%, while native species relative cover was at the lower end of the 51-75% category. In general, this type was somewhat weedy and occurred near the upland boundary.

Estimated Wetland Amount: 0.60 ac

Code: 117

SCVWD Wetlands Plant List

Facility Name:	Berryessa Creek	**Survey Start Date:**	8/23/2001
Location:	from Calaveras Blvd to Lower Penitencia Crk	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Vegetation Type: Vegetation Type 6 of 6

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
=20-50%	ASTERACEAE	*Picris echioides*	FAC	E
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	TYPHACEAE	*Typha spp.*	OBL	N
<20%	APIACEAE	*Foeniculum vulgare*	FACU	E
	ASTERACEAE	*Lactuca serriola*	FAC	E
	ASTERACEAE	*Xanthium strumarium*	FAC+	E
	BRASSICACEAE	*Raphanus sativus*	UPL	E
	EQUISETACEAE	*Equisetum arvense*	FAC	N
	LYTHRACEAE	*Lythrum hyssopifolia*	FACW	E
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	POACEAE	*Bromus catharticus*	NOL	E
	POACEAE	*Echinochloa crus-galli*	FACW	E
	POACEAE	*Cynodon dactylon*	FAC	E
	POACEAE	*Paspalum distichum*	OBL	N
	POACEAE	*Piptatherum miliaceum*	NOL	E
	POACEAE	*Polypogon monspeliensis*	FACW+	E
	POACEAE	*Agrostis viridis*	OBL	E
	POLYGONACEAE	*Rumex crispus*	FACW-	E
	POLYGONACEAE	*Polygonum lapathifolium*	OBL	N
	POLYGONACEAE	*Polygonum persicaria*	FACW	E
	SALICACEAE	*Salix laevigata*	NOL	N
	TYPHACEAE	*Typha angustifolia*	OBL	N
	TYPHACEAE	*Typha latifolia*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 117

SCVWD Wetland Assessment Checklist

Facility Name: Berryessa Creek
Location: from Hwy 680 to Montague Expwy

Survey Start Date: 6/29/2001
Survey End Date: 7/9/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Tidal or Nontidal: NonTidal
If nontidal, is water in channel?: Yes

Investigator: Janell Hillman
Station # Start: 16700
Station # End: 20200

Map or Photo Used: not applicable
Acreage Estimates Made From: Field Measure
Photo Documentation: Digital
Photo Code: 30J

Dominance (>50% Relative Cover):

NonTidal: non-native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	26-50%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

This section of Berryessa Creek had flowing water (between 1 and 8 inches) at the time of survey, unlike previous years. Near Montague Expwy, wetland occurred only sporadically as a thin fringe at the edges of the channel. Most of the channel is narrow here and shaded by tall weeds. Soil was gravelly. At the first bend in the channel upstream, at the concrete apron where the channel widens, wetland vegetation became more established on developing gravel bars. These gravel bars were moist to saturated and contained cobbles and finer gravel particles.

The wetland was dominated by mixed grasses, with Cynodon dactylon, Echinochloa crus-galli and Paspalum distichum each occuriing at 20-50% relative cover. Total cover was about 90%. Native species relative cover was between 26-50%. There were no invasive species present.

The presence this year of flowing water in a previously ephemeral channel has resulted in much more wetland than in previous years. However, the wetland is more weedy due to the abundance of the exotic grasses Cynodon and Echinochloa. The one common native grass, Paspalum distichum, was not found in previous years although it has been a past major component of the adjacent reference site (located downstream).

Estimated Wetland Amount:

13140sq. ft., 0.30 ac

Code: 111

SCVWD Wetlands Plant List

Facility Name: Berryessa Creek
Location: from Hwy 680 to Montague Expwy
Survey Start Date: 6/29/2001
Investigator: Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
=20-50%	POACEAE	*Echinochloa crus-galli*	FACW	E
	POACEAE	*Cynodon dactylon*	FAC	E
	POACEAE	*Paspalum distichum*	OBL	N
<20%	AMARANTHACEAE	*Amaranthus deflexus*	NOL	E
	AMARANTHACEAE	*Amaranthus powellii*	NOL	E
	APIACEAE	*Foeniculum vulgare*	FACU	E
	ASTERACEAE	*Picris echioides*	FAC	E
	ASTERACEAE	*Gnaphalium luteo-album*	FACW-	E
	ASTERACEAE	*Lactuca serriola*	FAC	E
	ASTERACEAE	*Xanthium strumarium*	FAC+	E
	BRASSICACEAE	*Rorippa nasturtium-aquaticum*	OBL	N
	BRASSICACEAE	*Brassica nigra*	UPL	E
	BRASSICACEAE	*Raphanus sativus*	UPL	E
	CHENOPODIACEAE	*Chenopodium album*	FAC	E
	CHENOPODIACEAE	*Atriplex triangularis*	FACW	N
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	JUNCACEAE	*Juncus patens*	FAC	N
	JUNCACEAE	*Juncus xiphioides*	OBL	N
	LAMIACEAE	*Mellisa officinalis*	NOL	E
	LAMIACEAE	*Mentha spicata*	OBL	E
	LYTHRACEAE	*Lythrum hyssopifolia*	FACW	E
	MALVACEAE	*Malva sp.*	NOL	E
	ONAGRACEAE	*Epilobium sp.*	NOL	N
	POACEAE	*Phalaris aquatica*	FAC+	E
	POACEAE	*Paspalum dilatatum*	FAC	E
	POACEAE	*Leptochloa fascicularis*	OBL	N
	POACEAE	*Polypogon monspeliensis*	FACW+	E
	POACEAE	*Lolium multiflorum*	NOL	E
	POACEAE	*Setaria pumila*	NOL	E
	POACEAE	*Digitaria sanguinalis*	FACU	E
	POACEAE	*Agrostis viridis*	OBL	E
	POLYGONACEAE	*Rumex crispus*	FACW-	E
	POLYGONACEAE	*Polygonum persicaria*	FACW	E
	POLYGONACEAE	*Polygonum punctatum*	OBL	N
	PORTULACACEAE	*Portulaca oleracea*	FAC	E
	ROSACEAE	*Rubus discolor*	FACW	E
	SALICACEAE	*Populus fremontii*	FACW	N
	SALICACEAE	*Salix laevigata*	NOL	N
	SALICACEAE	*Salix lasiolepis*	FACW	N

---

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 111

SCVWD Wetland Assessment Checklist

Facility Name: San Tomas Aquino Creek
Location: from Great America Pkwy to u/s of Hetchy Hetchy pipes

Survey Start Date: 9/6/2001
Survey End Date: 9/6/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Tidal or Nontidal: Tidal
If nontidal, is water in channel?:

Investigator: Janell Hillman
Station # Start: 5200
Station # End: 10500

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 31J

Vegetation Type: Type 1 of 3: Scirpus

Dominance (>50% Relative Cover): Tidal: California bulrush

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

This section of San Tomas contained three wetland vegetation types: a type dominated by perennial emergent vegetation growing in the center and at the edges of the channel; a second type dominated by low-growing herbaceous vegetation along the bank margins and at the edges of Vegetation Type 1; and a third type dominated by nonnatives and occurring at higher elevation then either of the other two types.

Vegetation type 1 of 3 occurred low in the channel and in often in the center on island-like benches. It was dominated by Scirpus californicus (>50% relative cover) and was mainly found on elevated mud flats in the low flow channel and along bank margins. Cover was thick (76-100%). Native species relative cover was high (76-100% category). Other species found at the fringe of this type included Polygonum punctatum, Ludwigia peploides, and some Typha angustifolia. This vegetation type has expanded significantly since last year.

Estimated Wetland Amount: 0.48 ac

Code: 116

SCVWD Wetlands Plant List

Facility Name:	San Tomas Aquino Creek	**Survey Start Date:**	9/6/2001
Location:	from Great America Pkwy to u/s of Hetchy Hetchy pipes	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Vegetation Type: Type 1 of 3: Scirpus

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	CYPERACEAE	*Scirpus californicus*	OBL	N
<20%	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
	POACEAE	*Leersia oryzoides*	OBL	N
	POLYGONACEAE	*Polygonum punctatum*	OBL	N
	TYPHACEAE	*Typha angustifolia*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 116

SCVWD Wetland Assessment Checklist

Facility Name: San Tomas Aquino Creek
Location: from Great America Pkwy to u/s of Hetchy Hetchy pipes

Survey Start Date: 9/6/2001
Survey End Date: 9/6/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Tidal or Nontidal: Tidal
If nontidal, is water in channel?:

Investigator: Janell Hillman
Station # Start: 5200
Station # End: 10500

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 31J

Vegetation Type: Type 2 of 3: native

Dominance (>50% Relative Cover): Tidal: other native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 2 of 3 was found along the bank margins, typically at slightly higher elevation than type 1. Type 2 was dominated by a mixture of low-growing herbaceous species such as Polgonum punctatum and P. persicaria (20-50% combined relative cover), Ludwigia peploides (20-50% relative cover), and Leptochloa fascicularis (especially common at the d/s end of the study site). Upstream of Tasman Dr., this habitat type became more weedy and diverse. Native species relative cover was at the low end of the 76-100% category, while total cover was 100%. Invasive species relative cover was <5%, with occasional Lepidium latifolium (not common).

Estimated Wetland Amount: 1.55 ac

Code: 116

SCVWD Wetlands Plant List

Facility Name:	San Tomas Aquino Creek	**Survey Start Date:**	9/6/2001
Location:	from Great America Pkwy to u/s of Hetchy Hetchy pipes	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Vegetation Type: Type 2 of 3: native

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
=20-50%	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
	POLYGONACEAE	*Polygonum persicaria*	FACW	E
	POLYGONACEAE	*Polygonum punctatum*	OBL	N
<20%	ASTERACEAE	*Aster chilensis*	FAC	N
	ASTERACEAE	*Artemisia douglasiana*	FACW	N
	ASTERACEAE	*Picris echioides*	FAC	E
	ASTERACEAE	*Euthamia occidentalis*	OBL	N
	ASTERACEAE	*Xanthium strumarium*	FAC+	E
	BRASSICACEAE	*Raphanus sativus*	UPL	E
	CHENOPODIACEAE	*Chenopodium ambrosioides*	FAC	E
	CHENOPODIACEAE	*Atriplex triangularis*	FACW	N
	CYPERACEAE	*Scirpus californicus*	OBL	N
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	CYPERACEAE	*Scirpus robustus*	OBL	N
	LAMIACEAE	*Mentha spicata*	OBL	E
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	POACEAE	*Echinochloa crus-galli*	FACW	E
	POACEAE	*Polypogon monspeliensis*	FACW+	E
	POACEAE	*Leersia oryzoides*	OBL	N
	POACEAE	*Agrostis viridis*	OBL	E
	POLYGONACEAE	*Polygonum amphibium var. emersum*	OBL	N
	POLYGONACEAE	*Rumex crispus*	FACW-	E
	SALICACEAE	*Populus fremontii*	FACW	N
	SALICACEAE	*Salix laevigata*	NOL	N
	SALICACEAE	*Salix lasiolepis*	FACW	N
	SALICACEAE	*Salix lucida ssp. lasiandra*	OBL	N
	TYPHACEAE	*Typha angustifolia*	OBL	N
	TYPHACEAE	*Typha latifolia*	OBL	N

---

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 116

SCVWD Wetland Assessment Checklist

Facility Name: San Tomas Aquino Creek
Location: from Great America Pkwy to u/s of Hetchy Hetchy pipes

Survey Start Date: 9/6/2001
Survey End Date: 9/6/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Tidal or Nontidal: Tidal
If nontidal, is water in channel?:

Investigator: Janell Hillman
Station # Start: 5200
Station # End: 10500

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 31J

Vegetation Type: Type 3 of 3: nonnative

Dominance (>50% Relative Cover): Tidal: non-native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	26-50%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 3 of 3 occurred at higher elevation on the bank than either type 1 or 2. Soil was still moist but typically not saturated. Dominant species included Cynodon dactylon (20-50% relative cover) and Euthamia occidentalis (20-50% relative cover). Foeniculum vulgare and Equisetum arvense were also common. Total cover was 100%. Native species relative cover was near the high end of the 26-50% category. Lepidium latifolium was common on site but at less than 5% relative cover. It was more prevalent at the downstream end of the sample site.

Estimated Wetland Amount: 0.01 ac

Code: 116

SCVWD Wetlands Plant List

Facility Name:	San Tomas Aquino Creek	**Survey Start Date:**	9/6/2001
Location:	from Great America Pkwy to u/s of Hetchy Hetchy pipes	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Vegetation Type: Type 3 of 3: nonnative

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
=20-50%	ASTERACEAE	*Euthamia occidentalis*	OBL	N
	POACEAE	*Cynodon dactylon*	FAC	E
<20%	APIACEAE	*Foeniculum vulgare*	FACU	E
	ASTERACEAE	*Artemisia douglasiana*	FACW	N
	BRASSICACEAE	*Lepidium latifolium*	FACW	I
	CHENOPODIACEAE	*Chenopodium ambrosioides*	FAC	E
	CHENOPODIACEAE	*Atriplex triangularis*	FACW	N
	EQUISETACEAE	*Equisetum arvense*	FAC	N
	POACEAE	*Phalaris aquatica*	FAC+	E
	POACEAE	*Paspalum distichum*	OBL	N
	POACEAE	*Piptatherum miliaceum*	NOL	E
	POLYGONACEAE	*Rumex crispus*	FACW-	E
	ROSACEAE	*Rubus parviflorus*	FAC+	N
	URTICACEAE	*Urtica dioica ssp. holosericea*	FACW	N

---

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 116

SCVWD Wetland Assessment Checklist

Facility Name: Sunnyvale East Channel
Location: from Hwy 237 to Caribbean Dr

Survey Start Date: 9/24/2001
Survey End Date: 9/24/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site
Tidal or Nontidal: Tidal
If nontidal, is water in channel?:

Investigator: Janell Hillman
Station # Start: 2300
Station # End: 6000

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo and Field Measure
Photo Documentation: Digital
Photo Code: 35J

Dominance (>50% Relative Cover):

Tidal: other native

Vegetation Quality Indicators:

Total % Cover:	51-75%
Native Species Relative % Cover:	51-75%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

The excavation site on Sunnyvale East constitutes the left bank of the study site. Wetland vegetation occurred sporadically as a thin fringe along the bank, which was steeply sloped and mostly barren of vegetation. The thin fringe of vetetation which did occur was dominated by Polygonum punctatum (>50% relative cover). Scirpus robustus was common at the downstream end of the site near Carribean Dr. The wetland fringe was patchy and discontinuous, and weedier than the adjacent reference site. Total cover was about 75%. Native species relative cover was within the 51-75% category. Invasive species cover was less than 5%, with Lepidium latifolium more common at the downstream end of the site near Caribbean Dr.

Estimated Wetland Amount:

0.12 ac

Code: 122

SCVWD Wetlands Plant List

Facility Name:	Sunnyvale East Channel	**Survey Start Date:**	9/24/2001
Location:	from Hwy 237 to Caribbean Dr	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Excavation Study Site

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	POLYGONACEAE	*Polygonum punctatum*	OBL	N
<20%	APIACEAE	*Foeniculum vulgare*	FACU	E
	BRASSICACEAE	*Lepidium latifolium*	FACW	I
	BRASSICACEAE	*Rorippa nasturtium-aquaticum*	OBL	N
	CYPERACEAE	*Scirpus pungens*	OBL	N
	CYPERACEAE	*Scirpus robustus*	OBL	N
	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
	POACEAE	*Bromus catharticus*	NOL	E
	POACEAE	*Echinochloa crus-galli*	FACW	E
	POACEAE	*Polypogon interruptus*	OBL	E
	POACEAE	*Piptatherum miliaceum*	NOL	E
	POACEAE	*Leersia oryzoides*	OBL	N
	POLYGONACEAE	*Rumex crispus*	FACW-	E
	POLYGONACEAE	*Polygonum persicaria*	FACW	E

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 122

APPENDIX C
1998 Adjacent Reference Site Checklists

SCVWD Wetland Assessment Checklist

Facility Name:	Berryessa Creek	**Survey Start Date:**	9/18/2001
Location:	from Hwy 237 (Calaveras Blvd) to Los Coches Ave	**Survey End Date:**	9/18/2001

Survey Chronology:	Post-Project Survey- 3rd Year	**Investigator:**	Janell Hillman
Site Type:	RS, Adjacent Reference Site	**Station # Start:**	8800
Tidal or Nontidal:	NonTidal	**Station # End:**	9300
If nontidal, is water in channel?:	Yes		

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 34J

Vegetation Type: Vegetation type 1 of 2: other native

Dominance (>50% Relative Cover): NonTidal: other native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	51-75%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

This section of Berryessa Creek contained two wetland vegetation types. One type was found on an elevated slope and was almost monospecific in dominance, while another, more mixed type occurred throughout the site at lower elevation near or within the low flow channel.

Vegetation type 1 of 2 was found along the low flow channel at the water's edge. Dominant cover was provided by Polygonum spp. (Polygonum persicaria, P. lapathifolium, and P. punctatum) with 20-50% cover (all species combined). Ludwigia peploides had cover around 20%. Also common were mixed monocots such as Cyperus eragrostis, Agrostis viridis, Lolium multiflorum, and Equisetum arvense. Total cover was within the 76-100% category, with native species relative cover at the low end of the 51-75% category. The low flow channel had flowing water at time of survey and soil was moist to saturated.

Estimated Wetland Amount: 0.15 ac

Code: 119

SCVWD Wetlands Plant List

Facility Name:	Berryessa Creek	**Survey Start Date:**	9/18/2001
Location:	from Hwy 237 (Calaveras Blvd) to Los Coches Ave	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year

Site Type: RS, Adjacent Reference Site

Vegetation Type: Vegetation type 1 of 2: other native

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
=20-50%	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
<20%	ASTERACEAE	*Conyza canadensis*	FAC	N
	ASTERACEAE	*Picris echioides*	FAC	E
	BRASSICACEAE	*Rorippa nasturtium-aquaticum*	OBL	N
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	EQUISETACEAE	*Equisetum arvense*	FAC	N
	FABACEAE	*Melilotus alba*	FACU+	E
	JUNCACEAE	*Juncus phaocephalus*	FACW	N
	LAMIACEAE	*Mentha x piperita*	OBL	E
	LYTHRACEAE	*Lythrum hyssopifolia*	FACW	E
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	POACEAE	*Phalaris aquatica*	FAC+	E
	POACEAE	*Echinochloa crus-galli*	FACW	E
	POACEAE	*Cynodon dactylon*	FAC	E
	POACEAE	*Paspalum distichum*	OBL	N
	POACEAE	*Leptochloa fascicularis*	OBL	N
	POACEAE	*Polypogon monspeliensis*	FACW+	E
	POACEAE	*Lolium multiflorum*	NOL	E
	POACEAE	*Agrostis viridis*	OBL	E
	POLYGONACEAE	*Polygonum lapathifolium*	OBL	N
	POLYGONACEAE	*Polygonum persicaria*	FACW	E
	POLYGONACEAE	*Polygonum punctatum*	OBL	N
	SALICACEAE	*Salix laevigata*	NOL	N
	SCROPHULARIACEAE	*Veronica anagallis-aquatica*	OBL	E
	TYPHACEAE	*Typha angustifolia*	OBL	N
	TYPHACEAE	*Typha latifolia*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 119

SCVWD Wetland Assessment Checklist

Facility Name: Berryessa Creek
Location: from Hwy 237 (Calaveras Blvd) to Los Coches Ave

Survey Start Date: 9/18/2001
Survey End Date: 9/18/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Adjacent Reference Site
Tidal or Nontidal: NonTidal
If nontidal, is water in channel?: Yes

Investigator: Janell Hillman
Station # Start: 8800
Station # End: 9300

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 34J

Vegetation Type: Vegetation type 2 of 2: other native

Dominance (>50% Relative Cover): NonTidal: other native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 2 of 2 was located in one area on the right bank of the channel near the Los Coches St. bridge. Dominant cover was provided by Equisetum arvense (>50% relative cover), which grew thickly and formed almost a monospecific community. This type was located above type 1 and the low flow channel. Total cover was very thick (100%). Native species relative cover was within the 76-100% category; higher than last year due to the reduced extent of the exotic Picris echioides. Native species cover was very high, although this was entirely due to Equistem arvense since it was the only native species found in this community. Other species which occurred sporadically include Picris echioides, Piptatherum milliaceum, Raphanus sativa, and Lolium multiflorum. Soil was moist.

Estimated Wetland Amount: 0.03 ac

Code: 119

SCVWD Wetlands Plant List

Facility Name:	Berryessa Creek	**Survey Start Date:**	9/18/2001
Location:	from Hwy 237 (Calaveras Blvd) to Los Coches Ave	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Adjacent Reference Site
Vegetation Type: Vegetation type 2 of 2: other native

Relative Cover	Family	Species	Wetland Indicator Status	Origin [1]
>50%	EQUISETACEAE	*Equisetum arvense*	FAC	N
<20%	ASTERACEAE	*Picris echioides*	FAC	E
	BRASSICACEAE	*Raphanus sativus*	UPL	E
	POACEAE	*Piptatherum miliaceum*	NOL	E
	POACEAE	*Lolium multiflorum*	NOL	E

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 119

SCVWD Wetland Assessment Checklist

Facility Name: Berryessa Creek
Location: from Montague Expwy d/s to 2nd railroad bridge

Survey Start Date: 9/18/2001
Survey End Date: 9/18/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Adjacent Reference Site
Tidal or Nontidal: NonTidal
If nontidal, is water in channel?: Yes

Investigator: Janell Hillman
Station # Start: 14300
Station # End: 16500

Map or Photo Used: not applicable
Acreage Estimates Made From: Field Measure
Photo Documentation: Digital
Photo Code: 34J

Vegetation Type: Vegetation type 1 of 2: other native

Dominance (>50% Relative Cover): NonTidal: other native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	51-75%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

This section of Berryessa Creek contained two wetland vegetation types. One type, which occurred extensively throughout the site, was dominated by mixed herbaceous species. The other type was less extensive and formed patches dominated by higher stature, perennial emergent vegetation.

Vegetation type 1 of 2 occurred extensively in the channel, at most times from bank to bank. Dominant cover was provided by Paspalum distichum (20-50% relative cover) and Polygonum persicaria (20-50% relative cover). Also common were Cyperus eragrostis and Ludwigia peploides ssp. peploides. Total cover was thick (76-100% category). Native species relative cover was at the low end of the 51-75% category, due to the extent of P. persicaria. Water was flowing in the channel at the time of survey. Wetland is thicker than last year.

The section from Montague to the first RR bridge was moist for a ways and then dry as the distance from the Montague overpass increased.

Estimated Wetland Amount: 8500 sq. ft, 0.20 ac

Code: 120

SCVWD Wetlands Plant List

Facility Name:	Berryessa Creek	**Survey Start Date:**	9/18/2001
Location:	from Montague Expwy d/s to 2nd railroad bridge	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Adjacent Reference Site
Vegetation Type: Vegetation type 1 of 2: other native

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
=20-50%	POACEAE	*Paspalum distichum*	OBL	N
	POLYGONACEAE	*Polygonum persicaria*	FACW	E
<20%	ASTERACEAE	*Conyza canadensis*	FAC	N
	ASTERACEAE	*Picris echioides*	FAC	E
	ASTERACEAE	*Lactuca serriola*	FAC	E
	ASTERACEAE	*Xanthium strumarium*	FAC+	E
	BRASSICACEAE	*Rorippa nasturtium-aquaticum*	OBL	N
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	CYPERACEAE	*Cyperus esculentus*	FACW	N
	EQUISETACEAE	*Equisetum arvense*	FAC	N
	LYTHRACEAE	*Lythrum hyssopifolia*	FACW	E
	MALVACEAE	*Malva sp.*	NOL	E
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
	POACEAE	*Phalaris aquatica*	FAC+	E
	POACEAE	*Echinochloa crus-galli*	FACW	E
	POACEAE	*Cynodon dactylon*	FAC	E
	POACEAE	*Leptochloa fascicularis*	OBL	N
	POLYGONACEAE	*Rumex crispus*	FACW-	E
	POLYGONACEAE	*Polygonum punctatum*	OBL	N
	SALICACEAE	*Salix laevigata*	NOL	N
	TYPHACEAE	*Typha angustifolia*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 120

SCVWD Wetland Assessment Checklist

Facility Name: Berryessa Creek
Location: from Montague Expwy d/s to 2nd railroad bridge

Survey Start Date: 9/18/2001
Survey End Date: 9/18/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Adjacent Reference Site
Tidal or Nontidal: NonTidal
If nontidal, is water in channel?: Yes

Investigator: Janell Hillman
Station # Start: 14300
Station # End: 16500

Map or Photo Used: not applicable
Acreage Estimates Made From: Field Measure
Photo Documentation: Digital
Photo Code: 34J

Vegetation Type: Vegetation type 2 of 2: cattail

Dominance (>50% Relative Cover): NonTidal: bulrush, cattail, burreed or mix

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 2 of 2 was found sporadically in the channel in patches, surrounded by vegetation type 1. Dominant cover was provided almost exclusively by Typha angustifolia (>50% relative cover). Other species included Echinochloa crus-galli, Cyperus eragrostis, and Polygonum persicaria. Total cover was thick (100%) and native (76-100% relative cover category). There were no invasive species present. This vegetation type has become established in the last year as cattail in the channel has increased.

Estimated Wetland Amount: 1545 sq. ft, 0.04 ac

Code: 120

SCVWD Wetlands Plant List

Facility Name:	Berryessa Creek	**Survey Start Date:**	9/18/2001
Location:	from Montague Expwy d/s to 2nd railroad bridge	**Investigator:**	Janell Hillman

Survey Chronology:	Post-Project Survey- 3rd Year
Site Type:	RS, Adjacent Reference Site
Vegetation Type:	Vegetation type 2 of 2: cattail

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	TYPHACEAE	*Typha angustifolia*	OBL	N
<20%	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	LYTHRACEAE	*Lythrum hyssopifolia*	FACW	E
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
	POACEAE	*Echinochloa crus-galli*	FACW	E
	POACEAE	*Paspalum distichum*	OBL	N
	POACEAE	*Agrostis viridis*	OBL	E
	POLYGONACEAE	*Polygonum persicaria*	FACW	E

---

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 120

SCVWD Wetland Assessment Checklist

Facility Name:	Sunnyvale East Channel	**Survey Start Date:**	9/24/2001
Location:	from Hwy 237 to Caribbean Dr	**Survey End Date:**	9/24/2001

Survey Chronology:	Post-Project Survey- 3rd Year	**Investigator:**	Janell Hillman
Site Type:	RS, Adjacent Reference Site	**Station # Start:**	2300
Tidal or Nontidal:	Tidal	**Station # End:**	6000
If nontidal, is water in channel?:			

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo and Field Measure
Photo Documentation: Digital
Photo Code: 35J

Dominance (>50% Relative Cover):

Tidal: other native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

The reference site on Sunnyvale East constitutes the west, or right bank of the study area. Wetland vegetation occurred thickly on a low bench above the low flow channel. Dominant cover was provided by Polygonum punctatum (>50% relative cover) as well as Ludwigia peploides and Leersia oryzoides (each with 20-50% relative cover). Leersia was more common at the upstream end of the sample site. Ludwigia typically was prominent at the edge of the low flow channel, but occasionally grew thickly on the low bench above the water. P. punctatum was well-distributed throughout the site. Total cover was thick (100%) and native (76-100% relative cover category). Invasive species relative cover was well below 5%, with Lepidium latifolium present but not contributing extensive cover.

Leersia is much more extensive this year, forming a co-dominant vegetation type.

Estimated Wetland Amount:

0.82 ac

Code: 121

SCVWD Wetlands Plant List

Facility Name:	Sunnyvale East Channel	**Survey Start Date:**	9/24/2001
Location:	from Hwy 237 to Caribbean Dr	**Investigator:**	Janell Hillman

Survey Chronology:	Post-Project Survey- 3rd Year
Site Type:	RS, Adjacent Reference Site

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	POLYGONACEAE	*Polygonum punctatum*	OBL	N
=20-50%	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
	POACEAE	*Leersia oryzoides*	OBL	N
<20%	ASTERACEAE	*Picris echioides*	FAC	E
	ASTERACEAE	*Xanthium strumarium*	FAC+	E
	BRASSICACEAE	*Lepidium latifolium*	FACW	I
	BRASSICACEAE	*Rorippa nasturtium-aquaticum*	OBL	N
	CHENOPODIACEAE	*Atriplex triangularis*	FACW	N
	CYPERACEAE	*Scirpus californicus*	OBL	N
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	CYPERACEAE	*Scirpus robustus*	OBL	N
	MALVACEAE	*Malva sp.*	NOL	E
	POACEAE	*Sorghum bicolor*	FAC	E
	POACEAE	*Bromus catharticus*	NOL	E
	POACEAE	*Cynodon dactylon*	FAC	E
	POACEAE	*Paspalum distichum*	OBL	N
	POACEAE	*Polypogon interruptus*	OBL	E
	POACEAE	*Agrostis viridis*	OBL	E
	POLYGONACEAE	*Rumex crispus*	FACW-	E
	POLYGONACEAE	*Polygonum persicaria*	FACW	E
	SCROPHULARIACEAE	*Veronica anagallis-aquatica*	OBL	E

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

SCVWD Wetland Assessment Checklist

Facility Name: San Tomas Aquino Creek

Location: from Great America Pkwy to u/s of Hetchy Hetchy pipes

Survey Start Date: 9/6/2001

Survey End Date: 9/6/2001

Survey Chronology: Post-Project Survey- 3rd Year

Site Type: RS, Adjacent Reference Site

Tidal or Nontidal: Tidal

If nontidal, is water in channel?:

Investigator: Janell Hillman

Station # Start: 5200

Station # End: 10500

Map or Photo Used: not applicable

Acreage Estimates Made From: Aerial Photo

Photo Documentation: Digital

Photo Code: 31J

Vegetation Type: Type 1 of 3: Scirpus

Dominance (>50% Relative Cover): Tidal: California bulrush

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

This section of San Tomas contained three wetland vegetationt types: a type dominated by perennial emergent vegetation growing in the center and at the edges of the channel; a second type dominated by low-growing herbaceous vegetation along the bank margins and at the eges of Vegetation Type 1; and a third type dominated by nonnatives and occurring at higher elevation than either of the other two types.

Vegetation type 1 of 3 occurred low in the channel or in the center on island-like benches. It was dominated by Scirpus californicus (>50% relative cover) and was mainly found on elevated mud flats in the low flow channel and along bank margins. Cover wa thick (close to 100%). Native species relative cover was high (51-75% category). Other species found at the fringe of this type included Polygonum punctatum, Ludwigia peploides, and some Typha angustifolia. This vegetation type has expanded significantly since last year.

Estimated Wetland Amount: 0.51 ac

Code: 133

SCVWD Wetlands Plant List

Facility Name:	San Tomas Aquino Creek	**Survey Start Date:**	9/6/2001
Location:	from Great America Pkwy to u/s of Hetchy Hetchy pipes	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Adjacent Reference Site
Vegetation Type: Type 1 of 3: Scirpus

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	CYPERACEAE	*Scirpus californicus*	OBL	N
<20%	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
	POACEAE	*Leersia oryzoides*	OBL	N
	POLYGONACEAE	*Polygonum punctatum*	OBL	N
	TYPHACEAE	*Typha angustifolia*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 133

SCVWD Wetland Assessment Checklist

Facility Name:	San Tomas Aquino Creek	**Survey Start Date:**	9/6/2001
Location:	from Great America Pkwy to u/s of Hetchy Hetchy pipes	**Survey End Date:**	9/6/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Adjacent Reference Site
Tidal or Nontidal: Tidal
If nontidal, is water in channel?:

Investigator: Janell Hillman
Station # Start: 5200
Station # End: 10500

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 31J

Vegetation Type: Type 2 of 3: other native

Dominance (>50% Relative Cover): Tidal: other native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 2 of 3 was found along the bank margins, typically at slightly higher elevation than type 1. Type 2 was dominated by a mixture of low-growing herbaceous species such as Polygonum punctatum and P. persicaria (20-50% relative cover combined), Ludwigia peploides (20-50% relative cover), and Leptochloa fascicularis (especially common at the d/s end of the study site). Upstream of Tasman Dr., this habitat type became more weedy and diverse. Native species relative cover was at the low end of the 76-100% category, while total cover was 100%. Invasive species relative cover was <5%, with occasional Lepidium latifolium (not comoon).

Estimated Wetland Amount: 1.58 ac

Code: 133

SCVWD Wetlands Plant List

Facility Name:	San Tomas Aquino Creek	**Survey Start Date:**	9/6/2001
Location:	from Great America Pkwy to u/s of Hetchy Hetchy pipes	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Adjacent Reference Site
Vegetation Type: Type 2 of 3: other native

Relative Cover	Family	Species	Wetland Indicator Status	Origin [1]
=20-50%	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
	POLYGONACEAE	*Polygonum persicaria*	FACW	E
	POLYGONACEAE	*Polygonum punctatum*	OBL	N
<20%	ASTERACEAE	*Aster chilensis*	FAC	N
	ASTERACEAE	*Artemisia douglasiana*	FACW	N
	ASTERACEAE	*Picris echioides*	FAC	E
	ASTERACEAE	*Euthamia occidentalis*	OBL	N
	ASTERACEAE	*Xanthium strumarium*	FAC+	E
	BRASSICACEAE	*Raphanus sativus*	UPL	E
	CHENOPODIACEAE	*Chenopodium ambrosioides*	FAC	E
	CHENOPODIACEAE	*Atriplex triangularis*	FACW	N
	CYPERACEAE	*Scirpus californicus*	OBL	N
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	CYPERACEAE	*Scirpus robustus*	OBL	N
	LAMIACEAE	*Mentha spicata*	OBL	E
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	POACEAE	*Echinochloa crus-galli*	FACW	E
	POACEAE	*Polypogon monspeliensis*	FACW+	E
	POACEAE	*Leersia oryzoides*	OBL	N
	POACEAE	*Agrostis viridis*	OBL	E
	POLYGONACEAE	*Polygonum amphibium var. emersum*	OBL	N
	POLYGONACEAE	*Rumex crispus*	FACW-	E
	SALICACEAE	*Populus fremontii*	FACW	N
	SALICACEAE	*Salix laevigata*	NOL	N
	SALICACEAE	*Salix lasiolepis*	FACW	N
	SALICACEAE	*Salix lucida ssp. lasiandra*	OBL	N
	TYPHACEAE	*Typha angustifolia*	OBL	N
	TYPHACEAE	*Typha latifolia*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 133

SCVWD Wetland Assessment Checklist

Facility Name: San Tomas Aquino Creek
Location: from Great America Pkwy to u/s of Hetchy Hetchy pipes

Survey Start Date: 9/6/2001
Survey End Date: 9/6/2001

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Adjacent Reference Site
Tidal or Nontidal: Tidal
If nontidal, is water in channel?:

Investigator: Janell Hillman
Station # Start: 5200
Station # End: 10500

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code: 31J

Vegetation Type: Type 3 of 3: nonnative

Dominance (>50% Relative Cover): Tidal: non-native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	26-50%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 3 of 3 occurred at higher elevation on the bank than either type 1 or 2. Soil was still moist but typically not saturated. Dominant species included Cynodon dactylon (20-50% relative cover) and Euthamia occidentalis (20-50% relative cover). Foeniculum vulgare and Equisetum arvense were also common. Total cover was 100%. Native species relative cover was near the high end of the 26-50% category. Lepidium latifolium was common on site but at less than 5% relative cover. It was more prevalent at the downstream end of the sample site.

Estimated Wetland Amount: 0.20 ac

Code: 133

SCVWD Wetlands Plant List

Facility Name:	San Tomas Aquino Creek	**Survey Start Date:**	9/6/2001
Location:	from Great America Pkwy to u/s of Hetchy Hetchy pipes	**Investigator:**	Janell Hillman

Survey Chronology: Post-Project Survey- 3rd Year
Site Type: RS, Adjacent Reference Site
Vegetation Type: Type 3 of 3: nonnative

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
=20-50%	ASTERACEAE	*Euthamia occidentalis*	OBL	N
	POACEAE	*Cynodon dactylon*	FAC	E
<20%	APIACEAE	*Foeniculum vulgare*	FACU	E
	ASTERACEAE	*Artemisia douglasiana*	FACW	N
	BRASSICACEAE	*Lepidium latifolium*	FACW	I
	CHENOPODIACEAE	*Chenopodium ambrosioides*	FAC	E
	CHENOPODIACEAE	*Atriplex triangularis*	FACW	N
	EQUISETACEAE	*Equisetum arvense*	FAC	N
	POACEAE	*Phalaris aquatica*	FAC+	E
	POACEAE	*Paspalum distichum*	OBL	N
	POACEAE	*Piptatherum miliaceum*	NOL	E
	POLYGONACEAE	*Rumex crispus*	FACW-	E
	ROSACEAE	*Rubus parviflorus*	FAC+	N
	URTICACEAE	*Urtica dioica ssp. holosericea*	FACW	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 133

APPENDIX D
General Reference Site Checklists

SCVWD Wetland Assessment Checklist

Facility Name: Berryessa Creek
Location: 1500 ft u/s Los Coches Ave; length 215 ft

Survey Start Date: 10/1/2001
Survey End Date: 10/1/2001

Survey Chronology:
Site Type: RS, General Reference Site
Tidal or Nontidal: NonTidal
If nontidal, is water in channel?: Yes

Investigator: Janell Hillman
Station # Start: 10985
Station # End: 11200

Map or Photo Used: not applicable
Acreage Estimates Made From: Field Measure
Photo Documentation: Digital
Photo Code: 37J

Dominance (>50% Relative Cover): NonTidal: other native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

This section of Berryessa Creek was dominated by Ludwigia peploides and Rorippa nasturtium-aquaticum (each with 20-50% relative cover). Wetland occurred in the channel bank to bank in some places, while in other places it was more patchy. Other common species included Cynodon dactylon, Lolium multiflorum, and Polygonum persicaria. Total cover and native species relative cover were each at the low end of the 76-100% category. There were no invasive species present.

Native species relative cover was higher this year due to the conspicuous dominance of native Ludwigia and Rorippa.

Estimated Wetland Amount: 1171 sq. ft., or 0.03 ac

Code: 129

SCVWD Wetlands Plant List

Facility Name:	Berryessa Creek	**Survey Start Date:**	10/1/2001
Location:	1500 ft u/s Los Coches Ave; length 215 ft	**Investigator:**	Janell Hillman

Survey Chronology:
Site Type: RS, General Reference Site

Relative Cover	Family	Species	Wetland Indicator Status	Origin [1]
=20-50%	BRASSICACEAE	*Rorippa nasturtium-aquaticum*	OBL	N
	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
<20%	ASTERACEAE	*Picris echioides*	FAC	E
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	CYPERACEAE	*Scirpus robustus*	OBL	N
	LYTHRACEAE	*Lythrum hyssopifolia*	FACW	E
	POACEAE	*Bromus catharticus*	NOL	E
	POACEAE	*Cynodon dactylon*	FAC	E
	POACEAE	*Paspalum dilatatum*	FAC	E
	POACEAE	*Paspalum distichum*	OBL	N
	POACEAE	*Piptatherum miliaceum*	NOL	E
	POACEAE	*Polypogon monspeliensis*	FACW+	E
	POACEAE	*Lolium multiflorum*	NOL	E
	POACEAE	*Agrostis viridis*	OBL	E
	POLYGONACEAE	*Polygonum persicaria*	FACW	E
	POLYGONACEAE	*Polygonum punctatum*	OBL	N
	TYPHACEAE	*Typha angustifolia*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 129

SCVWD Wetland Assessment Checklist

Facility Name:	Fisher Creek	**Survey Start Date:**	8/23/2001
Location:	500 ft d/s Laguna Rd; length 100 ft	**Survey End Date:**	8/23/2001

Survey Chronology:
Site Type: RS, General Reference Site
Tidal or Nontidal: NonTidal
If nontidal, is water in channel?: Yes

Investigator: Gale Rankin
Station # Start: 14900
Station # End: 15000

Map or Photo Used: not applicable
Acreage Estimates Made From: Field Measure
Photo Documentation: n/a no photos
Photo Code:

Dominance (>50% Relative Cover): NonTidal: other native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Site conditions were similar to last year. Polygonum punctatum remains dominant on-site with over 75% relative cover. Cattails accounted for 10% or less of the cover, and were mostly in channel bed in the upper end of the site. Polygonum extended far up the banks, as last year, however, the soils were only slightly moist here, rather than saturated as last year. The wetland is narrower in the upstream half of the site where willows shade the east bank. The top of bank area is overgrown with dense Rubus ursinus and Conium maculatum, which blocked the view into the channel in this year's photograph.

Estimated Wetland Amount: 1177 sq. ft. (.04 ac)

Code: 112

SCVWD Wetlands Plant List

Facility Name:	Fisher Creek	**Survey Start Date:**	8/23/2001
Location:	500 ft d/s Laguna Rd; length 100 ft	**Investigator:**	Gale Rankin

Survey Chronology:

Site Type: RS, General Reference Site

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	POLYGONACEAE	*Polygonum punctatum*	OBL	N
<20%	APIACEAE	*Conium maculatum*	FACW	E
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
	TYPHACEAE	*Typha latifolia*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

SCVWD Wetland Assessment Checklist

Facility Name: East Little Llagas Creek
Location: from 300 ft d/s San Martin Crk to 220 ft d/s

Survey Start Date: 8/23/2001
Survey End Date: 8/23/2001

Survey Chronology:
Site Type: RS, General Reference Site
Tidal or Nontidal: NonTidal
If nontidal, is water in channel?: Yes

Investigator: Gale Rankin
Station # Start: 4500
Station # End: 4720

Map or Photo Used: not applicable
Acreage Estimates Made From:
Photo Documentation: Digital
Photo Code:

Dominance (>50% Relative Cover): :

Vegetation Quality Indicators:

Total % Cover:

Native Species Relative % Cover:

Invasive Species Relative % Cover:

Vegetation Description:

The site conditions were comparable to those in past years. The site was dry. Scattered inidividuals of some hydrophytic species occurred in the bed of this incised central portion of the channel bed, but no wetland was present. These included Xanthium strumarium, Cynodon dactylon, Plantago lanceolata, Polygonum arenastrum and Picris echioides.

Estimated Wetland Amount: none

Code: 115

SCVWD Wetland Assessment Checklist

Facility Name: Greystone Creek
Location: 500 ft u/s Camden Ave; length 210 ft

Survey Start Date: 9/27/2001
Survey End Date: 9/27/2001

Survey Chronology:
Site Type: RS, General Reference Site
Tidal or Nontidal: NonTidal
If nontidal, is water in channel?: Yes

Investigator: Janell Hillman
Station # Start: 1100
Station # End: 1310

Map or Photo Used: not applicable
Acreage Estimates Made From: Field Measure
Photo Documentation: Digital
Photo Code: 36J

Dominance (>50% Relative Cover):

NonTidal: other native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	51-75%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

This section of Greystone Creek was co-dominated by Cynodon dactylon, Epilobium ciliatum, and Rorippa nasturtium-aquaticum (each with 20-50% relative cover). Wetland occurred at the edges of the low-flow channel, as well as in patches in the channel bed. Cynodon was located at the top of low bank and wetland margin, Epilobium was found at the bank margins, while Rorippa was typically found in patches within the channel bed. Areas of the low flow channel which did not contain wetland had open flowing water. There were no invasive species present.

Estimated Wetland Amount:

478 sq. ft., or 0.01 ac

Code: 128

SCVWD Wetlands Plant List

Facility Name:	Greystone Creek	**Survey Start Date:**	9/27/2001
Location:	500 ft u/s Camden Ave; length 210 ft	**Investigator:**	Janell Hillman

Survey Chronology:

Site Type: RS, General Reference Site

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
=20-50%	BRASSICACEAE	*Rorippa nasturtium-aquaticum*	OBL	N
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	POACEAE	*Cynodon dactylon*	FAC	E
<20%	ASTERACEAE	*Picris echioides*	FAC	E
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	CYPERACEAE	*Cyperus esculentus*	FACW	N
	MALVACEAE	*Malva sp.*	NOL	E
	POACEAE	*Bromus catharticus*	NOL	E
	POACEAE	*Echinochloa crus-galli*	FACW	E
	POACEAE	*Agrostis viridis*	OBL	E
	POLYGONACEAE	*Polygonum punctatum*	OBL	N
	SCROPHULARIACEAE	*Veronica anagallis-aquatica*	OBL	E

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 128

SCVWD Wetland Assessment Checklist

Facility Name: Lower Silver Creek
Location: 250 ft d/s Silver Creek Rd; length 105 ft

Survey Start Date: 9/25/2001
Survey End Date: 9/25/2001

Survey Chronology:
Site Type: RS, General Reference Site
Tidal or Nontidal: NonTidal
If nontidal, is water in channel?: Yes

Investigator: Janell Hillman
Station # Start: 37395
Station # End: 37500

Map or Photo Used: not applicable
Acreage Estimates Made From: Field Measure
Photo Documentation: Digital
Photo Code: 35J

Dominance (>50% Relative Cover):

NonTidal: bulrush, cattail, burreed or mix

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	51-75%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

The sample site on Lower Silver Creek contained perennial emergent wetland filling most of the channel. Dominant cover was provided by Typha latifolia (>50% relative cover). Many of the other species were nonnative, although Polygonum punctatum was also common. Total cover was within the 76-100% category, while native species relative cover was at the lower end of the 51-75% category. The soil was saturated and smelled sulphurous and anaerobic. There were no invasive species present.

Some of the cattail at the downstream end of the sample site was yellowed and dying. In contrast, the upstream section looked like it is beginning to recover and was greener than last year. Upstream of the sample site, open patches of water were covered with Lemna sp.

Estimated Wetland Amount:

1680 sq. ft., or 0.04 ac

Code: 124

SCVWD Wetlands Plant List

Facility Name:	Lower Silver Creek	**Survey Start Date:**	9/25/2001
Location:	250 ft d/s Silver Creek Rd; length 105 ft	**Investigator:**	Janell Hillman

Survey Chronology:
Site Type: RS, General Reference Site

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	TYPHACEAE	*Typha latifolia*	OBL	N
<20%	ASTERACEAE	*Picris echioides*	FAC	E
	BORAGINACEAE	*Heliotropium currassavicum*	OBL	N
	CHENOPODIACEAE	*Atriplex triangularis*	FACW	N
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	POACEAE	*Echinochloa crus-galli*	FACW	E
	POLYGONACEAE	*Polygonum persicaria*	FACW	E
	POLYGONACEAE	*Polygonum punctatum*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 124

SCVWD Wetland Assessment Checklist

Facility Name: Norwood Creek
Location: from 780 ft u/s Lower Silver Crk; length 320 ft

Survey Start Date: 9/25/2001
Survey End Date: 9/25/2001

Survey Chronology:
Site Type: RS, General Reference Site
Tidal or Nontidal: NonTidal
If nontidal, is water in channel?: Yes

Investigator: Janell Hillman
Station # Start: 780
Station # End: 1100

Map or Photo Used: not applicable
Acreage Estimates Made From: Field Measure
Photo Documentation: Digital
Photo Code: 35J

Dominance (>50% Relative Cover):

NonTidal: other native

Vegetation Quality Indicators:

Total % Cover:	26-50%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

The sample site on Norwood Creek was mostly devoid of wetland vegetation. Only sporadic clumps of Cyperus eragrostis and Typha sp. existed at the bank margins. The channel was stagnant and the water was full of trash. There was evidence of the previous year's vegetation removal program: tops of Cyperus and Typha were sheared off with exposed fibers. These patchy clumps of wetland vegetation were prevalent enough to call a section of the site "wetland", although cover was very low.

Estimated Wetland Amount:

265 sq. ft.

Code: 125

SCVWD Wetlands Plant List

Facility Name:	Norwood Creek	**Survey Start Date:**	9/25/2001
Location:	from 780 ft u/s Lower Silver Crk; length 320 ft	**Investigator:**	Janell Hillman

Survey Chronology:
Site Type: RS, General Reference Site

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	CYPERACEAE	*Cyperus eragrostis*	FACW	N
=20-50%	TYPHACEAE	*Typha sp.*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 125

SCVWD Wetland Assessment Checklist

Facility Name:	Smith Creek	**Survey Start Date:**	9/27/2001
Location:	200 ft d/s Elam Ave; length 120 ft	**Survey End Date:**	9/27/2001

Survey Chronology:

Site Type: RS, General Reference Site

Tidal or Nontidal: NonTidal

If nontidal, is water in channel?: Yes

Investigator: Janell Hillman

Station # Start: 880

Station # End: 1000

Map or Photo Used: not applicable

Acreage Estimates Made From: Field Measure

Photo Documentation: Digital

Photo Code: 36J

Dominance (>50% Relative Cover):

NonTidal: non-native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	26-50%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

This section of Smith Creek contained a thin wetland fringe along the bank margins, with occasional wetland found in the channel bed in patches. Dominant cover was provided by Lolium multiflorum (>50% relative cover). Total cover was around 90%. Native species relative cover was fairly low (within the 26-50% category). Other common species included Polygonum punctatum and Bidens frondosa.

Estimated Wetland Amount:

506 sq. ft, or 0.01 ac

Code: 127

SCVWD Wetlands Plant List

Facility Name:	Smith Creek	**Survey Start Date:**	9/27/2001
Location:	200 ft d/s Elam Ave; length 120 ft	**Investigator:**	Janell Hillman

Survey Chronology:

Site Type: RS, General Reference Site

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	POACEAE	*Lolium multiflorum*	NOL	E
<20%	ASTERACEAE	*Picris echioides*	FAC	E
	ASTERACEAE	*Bidens frondosa*	FACW	N
	ASTERACEAE	*Lactuca serriola*	FAC	E
	BRASSICACEAE	*Rorippa nasturtium-aquaticum*	OBL	N
	BRASSICACEAE	*Raphanus sativus*	UPL	E
	CHENOPODIACEAE	*Atriplex triangularis*	FACW	N
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	POACEAE	*Echinochloa crus-galli*	FACW	E
	POLYGONACEAE	*Rumex crispus*	FACW-	E
	POLYGONACEAE	*Polygonum lapathifolium*	OBL	N
	POLYGONACEAE	*Polygonum punctatum*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 127

SCVWD Wetland Assessment Checklist

Facility Name:	Tularcitos Creek	**Survey Start Date:**	10/1/2001
Location:	from Shetland Ct d/s 380 ft	**Survey End Date:**	10/1/2001

Survey Chronology:
Site Type: RS, General Reference Site
Tidal or Nontidal: NonTidal
If nontidal, is water in channel?: Yes

Investigator: Janell Hillman
Station # Start: 900
Station # End: 1280

Map or Photo Used: not applicable
Acreage Estimates Made From: Field Measure
Photo Documentation: Digital
Photo Code: 37J

Vegetation Type: Vegetation type 1 of 2: water primrose

Dominance (>50% Relative Cover): NonTidal: other native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

This section of Tularcitos was dominated by two habitat types as in previous years: a low-growing herbaceous type and a higher-stature, emergent type. These types alternately completely dominated the channel. Wetland existed bank-to-bank and cover was extremely thick in both types. No open water was visible in the channel.

Vegetation type 1 of 2 was dominated by Ludwigia peploides ssp.peploides (>50% relative cover). Ludwigia occurred in the channel from bank to bank. Total cover was very thick (100%). Native species relative cover was high (within the 76-100% category). There were no invasive species present. This type was found intermittently covering the channel. At the downstream end of the site, Scirpus maritimus was common but at less than 20% relative cover.

This type is less extensive than last year, due to the expansion of Vegetation Type 2.

Estimated Wetland Amount: 931 sq.ft., or 0.02 ac

Code: 130

SCVWD Wetlands Plant List

Facility Name:	Tularcitos Creek	**Survey Start Date:**	10/1/2001
Location:	from Shetland Ct d/s 380 ft	**Investigator:**	Janell Hillman

Survey Chronology:
Site Type: RS, General Reference Site
Vegetation Type: Vegetation type 1 of 2: water primrose

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
<20%	ASTERACEAE	*Picris echioides*	FAC	E
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	CYPERACEAE	*Scirpus maritimus*	OBL	N
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	TYPHACEAE	*Typha latifolia*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 130

SCVWD Wetland Assessment Checklist

Facility Name: Tularcitos Creek
Location: from Shetland Ct d/s 380 ft

Survey Start Date: 10/1/2001
Survey End Date: 10/1/2001

Survey Chronology:
Site Type: RS, General Reference Site
Tidal or Nontidal: NonTidal
If nontidal, is water in channel?: Yes

Investigator: Janell Hillman
Station # Start: 900
Station # End: 1280

Map or Photo Used: not applicable
Acreage Estimates Made From: Field Measure
Photo Documentation: Digital
Photo Code: 37J

Vegetation Type:

Vegetation type 2 of 2: cattail

Dominance (>50% Relative Cover):

NonTidal: bulrush, cattail, burreed or mix

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 2 of 2 was dominated by Typha latifolia (>50% relative cover). This type was found alternately in the channel with vegetation type 1. Total cover was very thick, with multi-storied vegetation. Under the cattail, Ludwigia peploides formed a dominant understory (20-50% relative cover) which was less extensive than last year. This is most likely due to the thicker cover of cattail which shades more of the understory than in previous years.

This second vegetation type has become well-established since it was first called out as a separate type in 2000 and is more extensive than last year.

Estimated Wetland Amount:

6289 sq. ft., or 0.14 ac

Code: 130

SCVWD Wetlands Plant List

Facility Name:	Tularcitos Creek	**Survey Start Date:**	10/1/2001
Location:	from Shetland Ct d/s 380 ft	**Investigator:**	Janell Hillman

Survey Chronology:
Site Type: RS, General Reference Site
Vegetation Type: Vegetation type 2 of 2: cattail

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	TYPHACEAE	*Typha latifolia*	OBL	N
=20-50%	ONAGRACEAE	*Ludwigia peploides ssp. peploides*	OBL	N
<20%	ASTERACEAE	*Picris echioides*	FAC	E
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	CYPERACEAE	*Scirpus maritimus*	OBL	N
	JUNCACEAE	*Juncus xiphioides*	OBL	N
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	SALICACEAE	*Salix sp.*	NOL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 130

SCVWD Wetland Assessment Checklist

Facility Name: West Little Llagas Creek
Location: from Cosmo Ave u/s 100 ft

Survey Start Date: 8/23/2001
Survey End Date: 8/23/2001

Survey Chronology:
Site Type: RS, General Reference Site
Tidal or Nontidal: NonTidal
If nontidal, is water in channel?: No

Investigator: Gale Rankin
Station # Start: 10000
Station # End: 10100

Map or Photo Used: not applicable
Acreage Estimates Made From: Field Measure
Photo Documentation: Digital
Photo Code:

Dominance (>50% Relative Cover): :

Vegetation Quality Indicators:

Total % Cover:

Native Species Relative % Cover:

Invasive Species Relative % Cover:

Vegetation Description:

Site conditions were similar to the past 2 years. The channel bed was dry and no wetland was present. Scattered Xanthium strumarium were present in the channel bed. Scattered individuals or small clumps of other hydrophytic species were present in the channel bed and edge of low-flow channel where they mixed with upland species. Species present included Cynodon dactylon, Cicorium intybus, Avena sp., Raphanus sativus, Lolium multiflorum, Convolvulus arvensis and Phalaris sp.

Estimated Wetland Amount: 0

Code: 113

SCVWD Wetland Assessment Checklist

Facility Name:	West Little Llagas Creek	**Survey Start Date:**	8/23/2001
Location:	d/s Main St; length 80 ft	**Survey End Date:**	8/23/2001

Survey Chronology:
Site Type: RS, General Reference Site
Tidal or Nontidal: NonTidal
If nontidal, is water in channel?: Yes

Investigator: Gale Rankin
Station # Start: 15200
Station # End: 15280

Map or Photo Used: not applicable
Acreage Estimates Made From: Field Measure
Photo Documentation: Digital
Photo Code:

Dominance (>50% Relative Cover):

NonTidal: bulrush, cattail, burreed or mix

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

As in past years, wetland vegetation occupied the entire channel bed from bank to bank. Typha comprised nearly 100% of the cover. The other spicies present were lower stature herbs including Epilobium ciliatum and Polygonum punctatum. These were located in the outside edge of the dense cattail stand.

Estimated Wetland Amount:

960 sq. ft., 0.02 ac

Code: 114

SCVWD Wetlands Plant List

Facility Name:	West Little Llagas Creek		**Survey Start Date:**	8/23/2001
Location:	d/s Main St; length 80 ft		**Investigator:**	Gale Rankin

Survey Chronology:

Site Type: RS, General Reference Site

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	TYPHACEAE	*Typha latifolia*	OBL	N
<20%	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	POACEAE	*Cynodon dactylon*	FAC	E
	POLYGONACEAE	*Rumex crispus*	FACW-	E
	POLYGONACEAE	*Polygonum punctatum*	OBL	N

---

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 114

SCVWD Wetland Assessment Checklist

Facility Name: Guadalupe River
Location: 1400 ft to 750 ft u/s Tasman Dr

Survey Start Date: 9/10/2001
Survey End Date: 9/10/2001

Survey Chronology:
Site Type: RS, General Reference Site
Tidal or Nontidal: Tidal
If nontidal, is water in channel?:

Investigator: Janell Hillman
Station # Start: 31800
Station # End: 32550

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code:

Vegetation Type: Vegetation Type 1 of 3: native

Dominance (>50% Relative Cover): Tidal: other native

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	51-75%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

This section of Guadalupe River was dominated by three wetland vegetation types. The first type was dominated by a mix of low-growing herbaceous vegetation and occurred extensively throughout the study site. The second vegetation type was dominated by perennial emergent vegetation and occurred primarily at the edges of the low flow channel. The third vegetation type occurred predominately between the other two types in elevation. It too was dominated by perennial emergent wetland, but of a different kind. This type was also found sporadically in patches within Type 1.

Vegetation type 1 of 3 was the most extensive vegetetation type in the study area. It was found on the extremely wide, low benches above the low flow channel on both banks. The dominant cover was provided by Polygonum punctatum (20-50% relative cover), with Euthamia occidentalis and Leersia oryzoides also very common (20-50% relative cover each). Atriplex triangularis was common on the left bank, but was less extensive on the right bank. Total cover was extremely thick and layered (in exess of 100%), with vegetation heights approaching 4 ft. Native species relative cover was fairly high (within the 51-75% relative cover category), even though the exotic Picris echioides was also common on site. Soil was moist with a high amount of clay. Invasive species relative cover wa less than 5%, with Lepidium latifolium present but not commonl

In general, this vegetation type shows yearly fluctuations in species dominance and extent.

Estimated Wetland Amount: 2.41 ac

Code: 118

SCVWD Wetlands Plant List

Facility Name: Guadalupe River
Location: 1400 ft to 750 ft u/s Tasman Dr

Survey Start Date: 9/10/2001
Investigator: Janell Hillman

Survey Chronology:
Site Type: RS, General Reference Site
Vegetation Type: Vegetation Type 1 of 3: native

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
=20-50%	ASTERACEAE	*Euthamia occidentalis*	OBL	N
	POACEAE	*Leersia oryzoides*	OBL	N
	POLYGONACEAE	*Polygonum punctatum*	OBL	N
<20%	ASTERACEAE	*Picris echioides*	FAC	E
	ASTERACEAE	*Bidens frondosa*	FACW	N
	ASTERACEAE	*Xanthium strumarium*	FAC+	E
	ASTERACEAE	*Aster subulatus var. ligulatus*	FACW	N
	BRASSICACEAE	*Lepidium latifolium*	FACW	I
	CHENOPODIACEAE	*Atriplex triangularis*	FACW	N
	CYPERACEAE	*Scirpus californicus*	OBL	N
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	CYPERACEAE	*Scirpus robustus*	OBL	N
	ONAGRACEAE	*Epilobium ciliatum ssp. cilatum*	FACW	N
	POACEAE	*Phalaris aquatica*	FAC+	E
	POACEAE	*Paspalum dilatatum*	FAC	E
	POACEAE	*Piptatherum miliaceum*	NOL	E
	POACEAE	*Polypogon monspeliensis*	FACW+	E
	POLYGONACEAE	*Rumex crispus*	FACW-	E
	POLYGONACEAE	*Polygonum persicaria*	FACW	E

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 118

SCVWD Wetland Assessment Checklist

Facility Name: Guadalupe River
Location: 1400 ft to 750 ft u/s Tasman Dr

Survey Start Date: 9/10/2001
Survey End Date: 9/10/2001

Survey Chronology:
Site Type: RS, General Reference Site
Tidal or Nontidal: Tidal
If nontidal, is water in channel?:

Investigator: Janell Hillman
Station # Start: 31800
Station # End: 32550

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code:

Vegetation Type:
Vegetation Type 2 of 3: bulrush

Dominance (>50% Relative Cover):
Tidal: California bulrush

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 2 of 3 was found primarily at the edges of the low flow channel. Dominant cover was provided by Scirpus californicus (>50% relative cover), which thickly lined the banks above the channel and occurred almost monospecifically. The sole understory species was Polygonum punctatum, which occurred occasionally. Total cover was close to 100%. Native species relative cover was also very high (close to 100%).

Estimated Wetland Amount:
0.53 ac

Code: 118

SCVWD Wetlands Plant List

Facility Name:	Guadalupe River	**Survey Start Date:**	9/10/2001
Location:	1400 ft to 750 ft u/s Tasman Dr	**Investigator:**	Janell Hillman

Survey Chronology:

Site Type: RS, General Reference Site

Vegetation Type: Vegetation Type 2 of 3: bulrush

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	CYPERACEAE	*Scirpus californicus*	OBL	N
<20%	POLYGONACEAE	*Polygonum punctatum*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 118

SCVWD Wetland Assessment Checklist

Facility Name: Guadalupe River
Location: 1400 ft to 750 ft u/s Tasman Dr

Survey Start Date: 9/10/2001
Survey End Date: 9/10/2001

Survey Chronology:
Site Type: RS, General Reference Site
Tidal or Nontidal: Tidal
If nontidal, is water in channel?:

Investigator: Janell Hillman
Station # Start: 31800
Station # End: 32550

Map or Photo Used: not applicable
Acreage Estimates Made From: Aerial Photo
Photo Documentation: Digital
Photo Code:

Vegetation Type: Vegetation Type 3 of 3: cattail

Dominance (>50% Relative Cover): Tidal: cattail

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 3 of 3 occurred predominantly next to vegetation type 2. The dominant species was Typha angustifolia (>50% relative cover). It occurred in thick stands on the low benches above the low flow channel adjacent to Scirpus californicus. This type also occurred in sporadic patches throughout vegetation type 1, especially on the right bank. Total cover was thick (100%) and native (within the 76-100% category). Other common species included Polygonum punctatum, Euthamia occidentalis, Leersia oryzoides, and Aster subulatus var. ligulatus.

This type was lumped last year into Vegetation Type 2; however, it was extensive enough this year to call it out as a separate type.

Estimated Wetland Amount: 0.35 ac

Code: 118

SCVWD Wetlands Plant List

Facility Name: Guadalupe River
Location: 1400 ft to 750 ft u/s Tasman Dr

Survey Start Date: 9/10/2001
Investigator: Janell Hillman

Survey Chronology:
Site Type: RS, General Reference Site
Vegetation Type: Vegetation Type 3 of 3: cattail

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	TYPHACEAE	*Typha angustifolia*	OBL	N
<20%	ASTERACEAE	*Euthamia occidentalis*	OBL	N
	ASTERACEAE	*Aster subulatus var. ligulatus*	FACW	N
	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	POACEAE	*Leersia oryzoides*	OBL	N
	POLYGONACEAE	*Polygonum punctatum*	OBL	N
	TYPHACEAE	*Typha latifolia*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 118

SCVWD Wetland Assessment Checklist

Facility Name: Sunnyvale West Channel
Location: 250 ft u/s Caribbean Dr; length 440 ft

Survey Start Date: 9/24/2001
Survey End Date: 9/24/2001

Survey Chronology:
Site Type: RS, General Reference Site
Tidal or Nontidal: Tidal
If nontidal, is water in channel?:

Investigator: Janell Hillman
Station # Start: 5800
Station # End: 6240

Map or Photo Used: not applicable
Acreage Estimates Made From: Field Measure
Photo Documentation: Digital
Photo Code: 35J

Vegetation Type: Vegetation type 1 of 2: other native

Dominance (>50% Relative Cover): Tidal: other native

Vegetation Quality Indicators:

Total % Cover:	51-75%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

This section of Sunnyvale West was dominated by two wetland vegetation types. One type occurred adjacent to the low flow channel and was dominated by low-growing herbaceous vegetation. The second vegetation type occurred sporadically in patches alternating with Type 1. Type 2 was dominated by taller stature perennial emergent vegetation.

Vegetation type 1 of 2 occurred on the bank margins above the low flow channel, alternating in patches with vegetation type 1. Dominant cover was provided by Polygonum punctatum (>50% relative cover). Few other species was present, as the wetland ocurred in thin patches at low cover and was not very diverse. Total cover was at the lower end of the 51-57% category. Native species relative cover was high (76-100% category). Invasive species relative cover was less than 5%.

There was some evidence that the upper edge of both banks at the upland interface had been mowed, which has resulted in the lower total vegetation cover.

Estimated Wetland Amount: 3594 sq. ft, 0.08 ac

Code: 123

SCVWD Wetlands Plant List

Facility Name:	Sunnyvale West Channel	**Survey Start Date:**	9/24/2001
Location:	250 ft u/s Caribbean Dr; length 440 ft	**Investigator:**	Janell Hillman

Survey Chronology:
Site Type: RS, General Reference Site
Vegetation Type: Vegetation type 1 of 2: other native

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	POLYGONACEAE	*Polygonum punctatum*	OBL	N
<20%	CYPERACEAE	*Cyperus eragrostis*	FACW	N
	POACEAE	*Bromus catharticus*	NOL	E
	POLYGONACEAE	*Rumex crispus*	FACW-	E

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 123

SCVWD Wetland Assessment Checklist

Facility Name:	Sunnyvale West Channel	**Survey Start Date:**	9/24/2001
Location:	250 ft u/s Caribbean Dr; length 440 ft	**Survey End Date:**	9/24/2001

Survey Chronology:
Site Type: RS, General Reference Site
Tidal or Nontidal: Tidal
If nontidal, is water in channel?:

Investigator: Janell Hillman
Station # Start: 5800
Station # End: 6240

Map or Photo Used: not applicable
Acreage Estimates Made From: Field Measure
Photo Documentation: Digital
Photo Code: 35J

Vegetation Type:
Vegetation type 2 of 2: bulrush

Dominance (>50% Relative Cover):
Tidal: California bulrush

Vegetation Quality Indicators:

Total % Cover:	76-100%
Native Species Relative % Cover:	76-100%
Invasive Species Relative % Cover:	5% or less

Vegetation Description:

Vegetation type 2 of 2 occurred on the bank margins above the low flow channel, alternating in patches with vegetation type 1. Dominant cover was provided by Scirpus californicus (>50% relative cover). Few other species were present. This type was very patchy, with Scirpus californica occurring in discontinous patches. Total cover was within the 76-100% category. Native species relative cover was also within the 76-100% category. Invasive species relative cover was less than 5%.

Estimated Wetland Amount:
752 sq. ft., 0.02 ac

Code: 123

SCVWD Wetlands Plant List

Facility Name:	Sunnyvale West Channel	**Survey Start Date:**	9/24/2001
Location:	250 ft u/s Caribbean Dr; length 440 ft	**Investigator:**	Janell Hillman

Survey Chronology:
Site Type: RS, General Reference Site
Vegetation Type: Vegetation type 2 of 2: bulrush

Relative Cover	Family	Species	Wetland Indicator Status	Origin[1]
>50%	CYPERACEAE	*Scirpus californicus*	OBL	N
<20%	POLYGONACEAE	*Polygonum punctatum*	OBL	N

[1] N = Native, E = Exotic, I = Invasive Exotic, UNK=Unknown Origin

Code: 123

APPENDIX E
1998 Excavation and Adjacent Reference Site Photographs

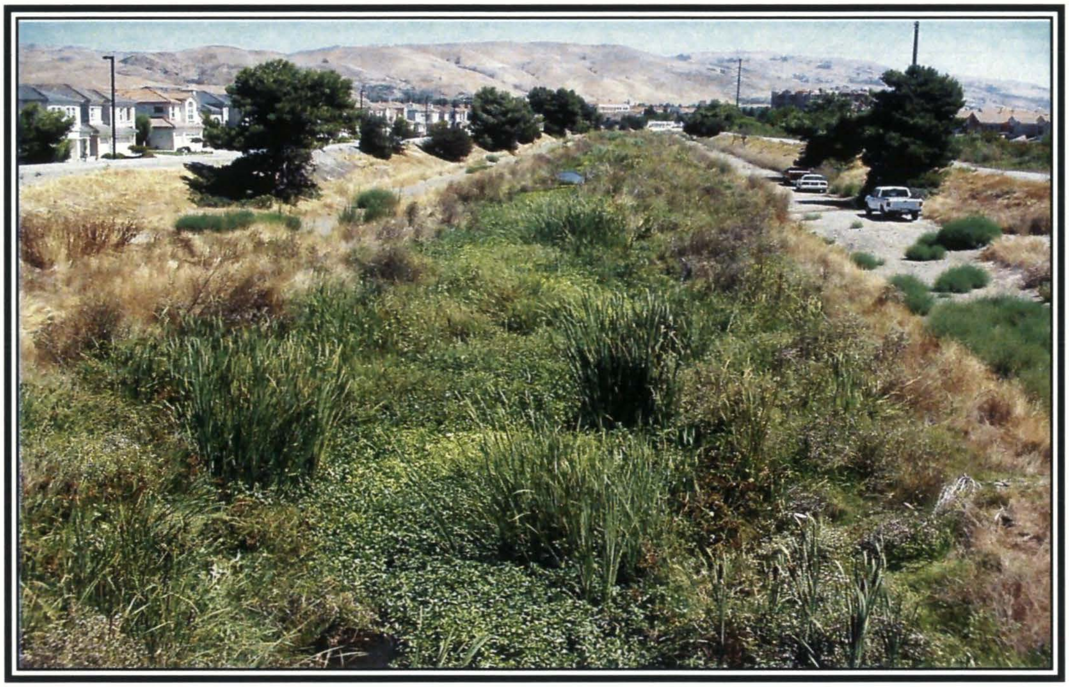


Figure 1a. View u/s Milpitas Blvd.

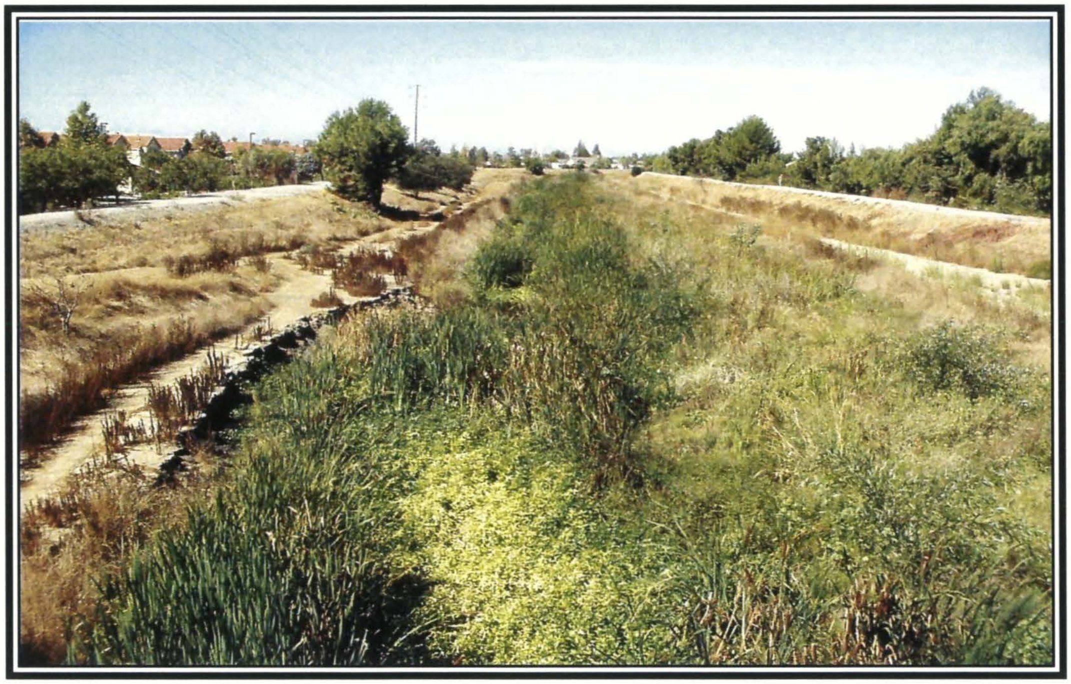


Figure 1b. View d/s Milpitas Blvd.

Figure 1. Berryessa Creek u/s Lower Penitencia Creek: 1998 Excavation Sites. Third year post-project. Site was composed of other native-dominated wetlands in the low flow channels, and nonnative wetland on higher benches. Photo date: 9/11/01.

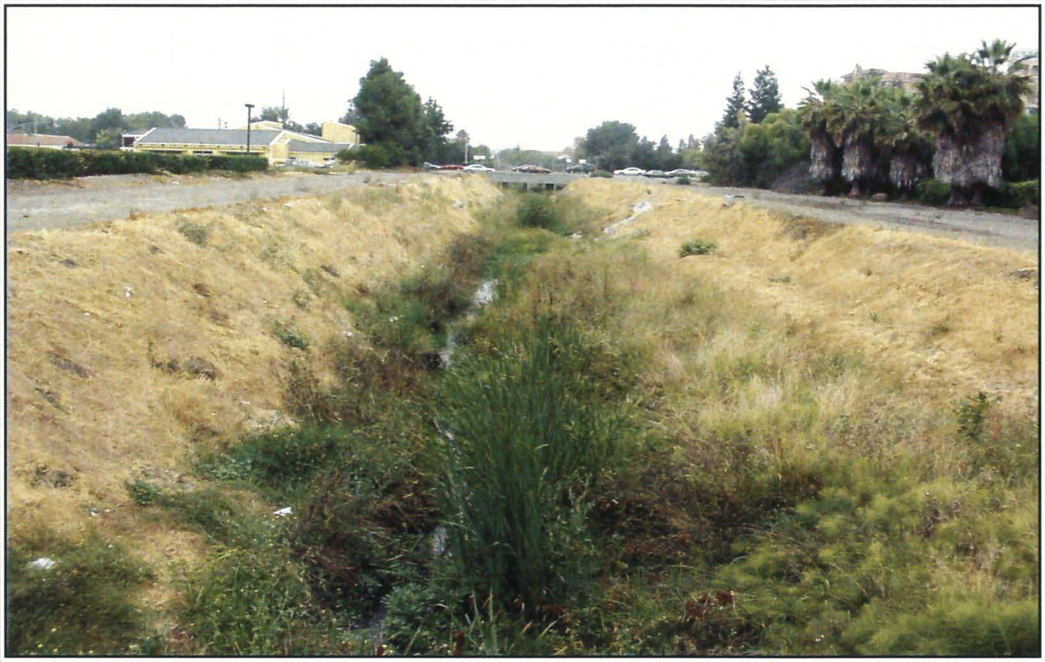
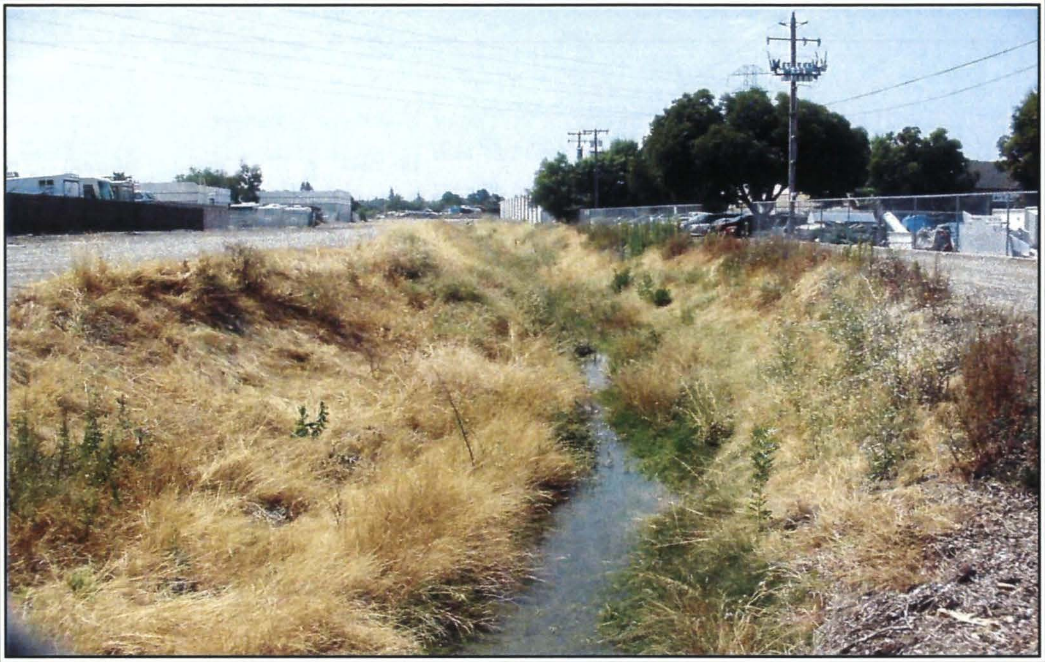
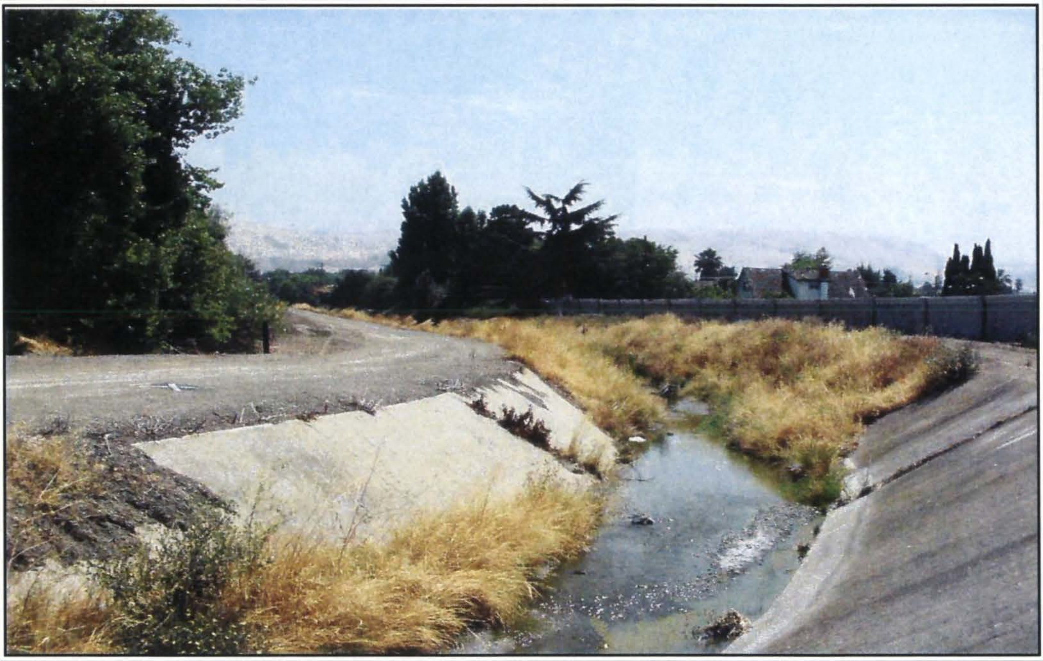


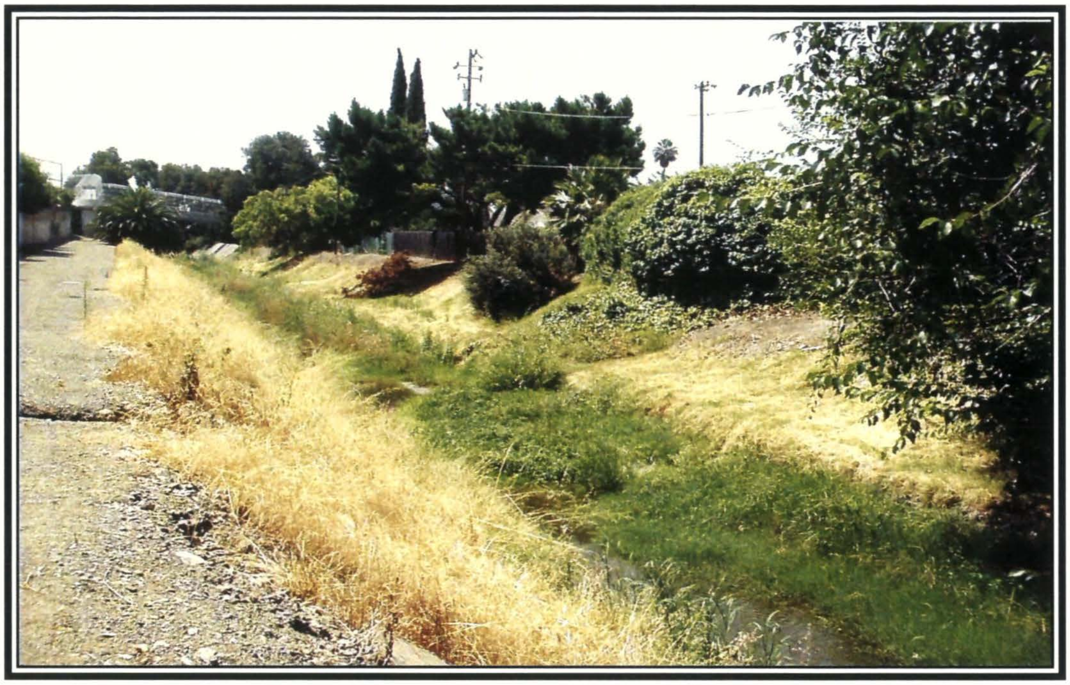
Figure 2. Berryessa Creek from Calaveras Blvd. to Los Coches Ave. Adjacent Reference Site. Photo date: 10/04/01.



3a. View u/s from Montague Expwy.



3b. View u/s towards bend.



3c. View u/s of second bend.

Figure 3. Berryessa Creek u/s of Montague Expwy: 1998 Excavation Site. Photo date: 7/9/01.

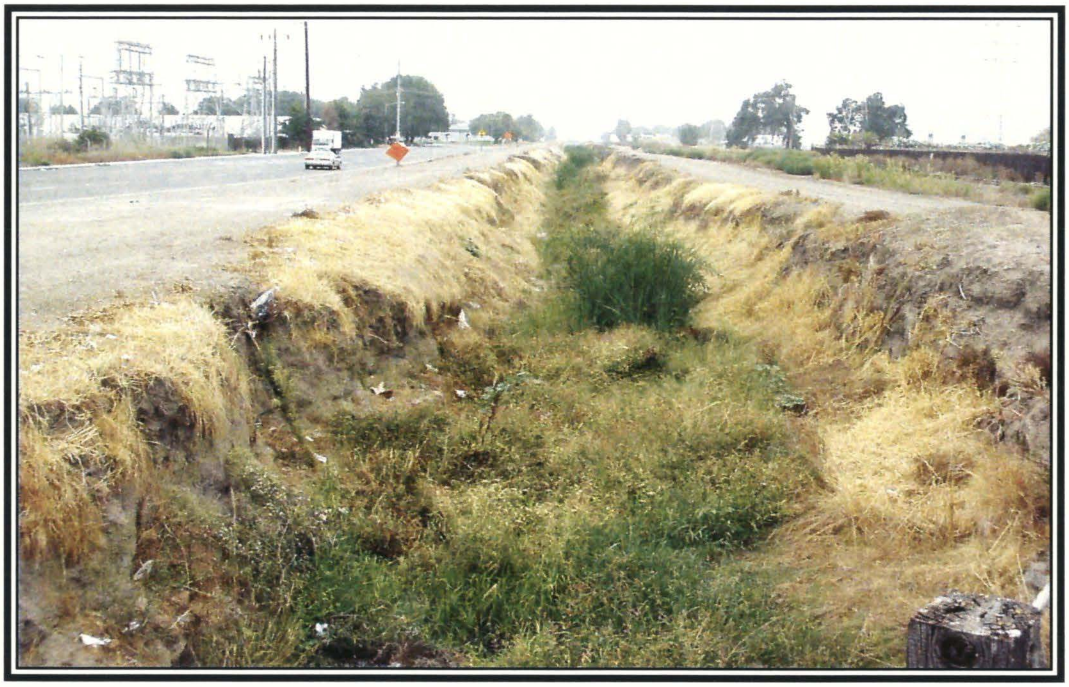


Figure 4. Berryessa Creek d/s Montague Expwy: Adjacent Reference Site. Photo date: September 2001. View d/s from railroad bridge towards 2^{nd} railroad bridge.

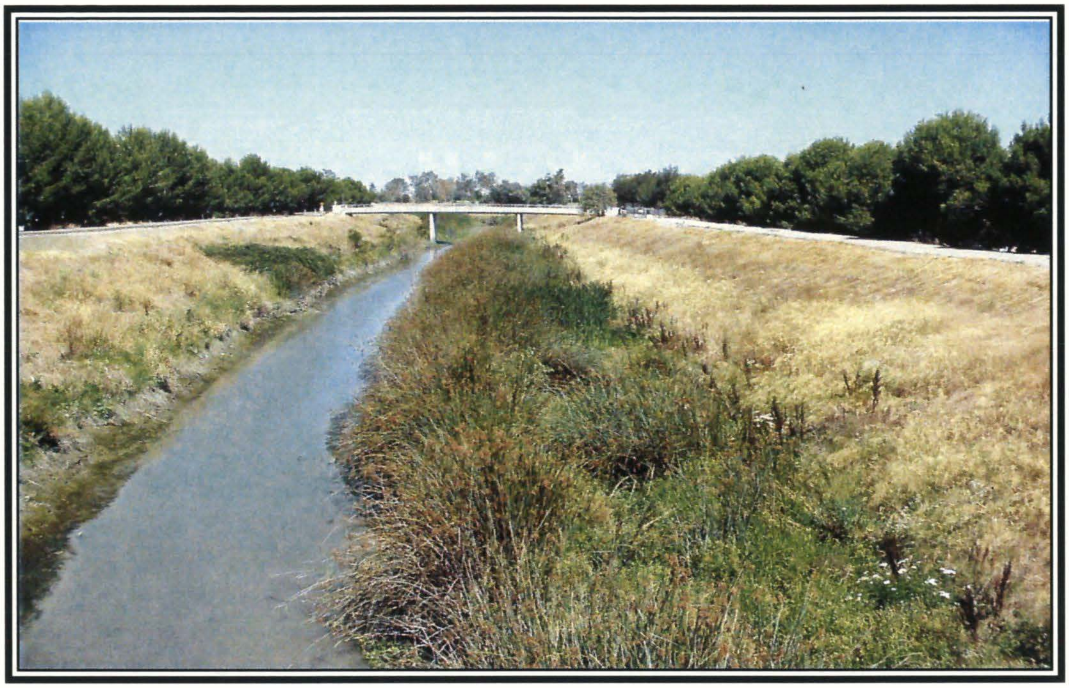


Figure 5. San Tomas (tidal) u/s Great America Parkway: 1998 Excavation and Reference Sites. Third year post-project. View d/s from Tasman Rd. Excavation site: right bank in photo; Reference site: left bank in photo. Photo date: 9/06/01.

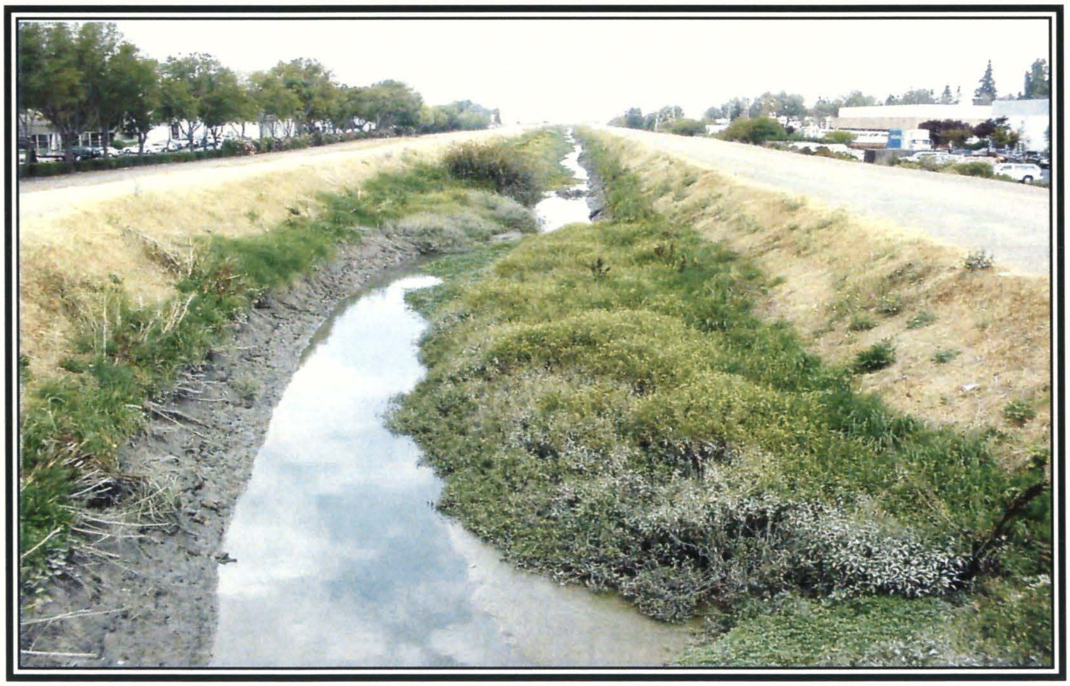


Figure 6. Sunnyvale East 1998 Excavation and Adjacent Reference site: third year post-project. View d/s Hwy. 237 frontage road. Excavation site: right bank in photo; Reference site: left bank. Photo date: 9/24/01.

APPENDIX F
General Reference Site Photographs

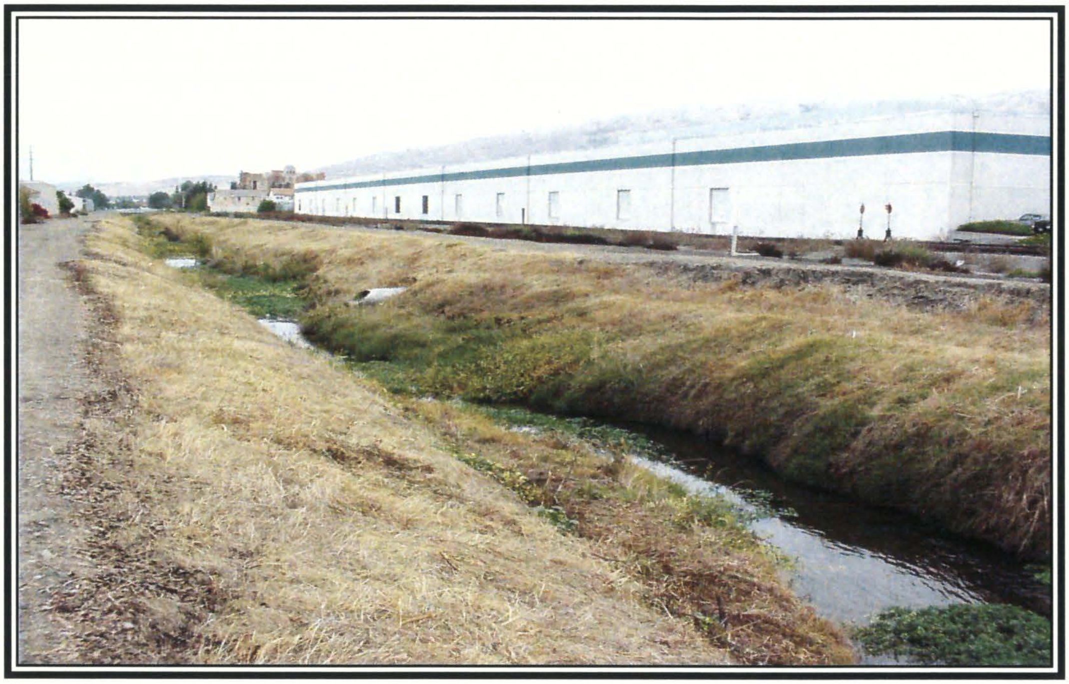


Figure 1. Berryessa Creek General Reference Site (STA 109+86-112+00). View looking downstream. October 2001.

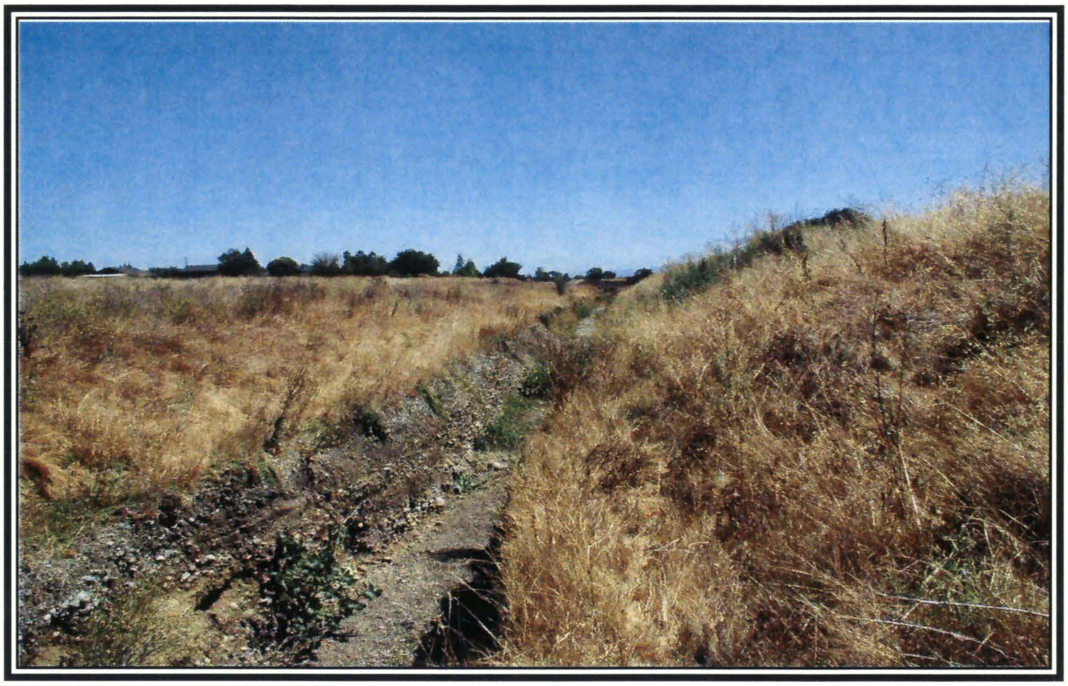


Figure 2. East Little Llagas Creek General Reference Site (STA 45+00-47+20). August 2001.

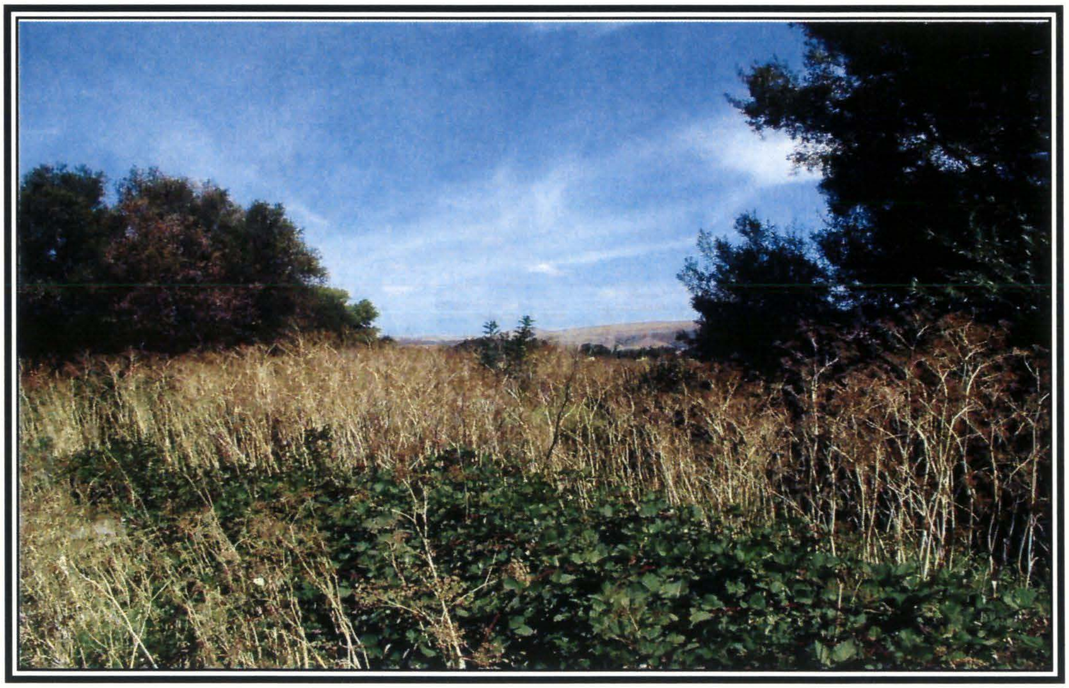


Figure 3. Fisher Creek General Reference Site (STA 149+00-150+00). View looking downstream. August 2001.

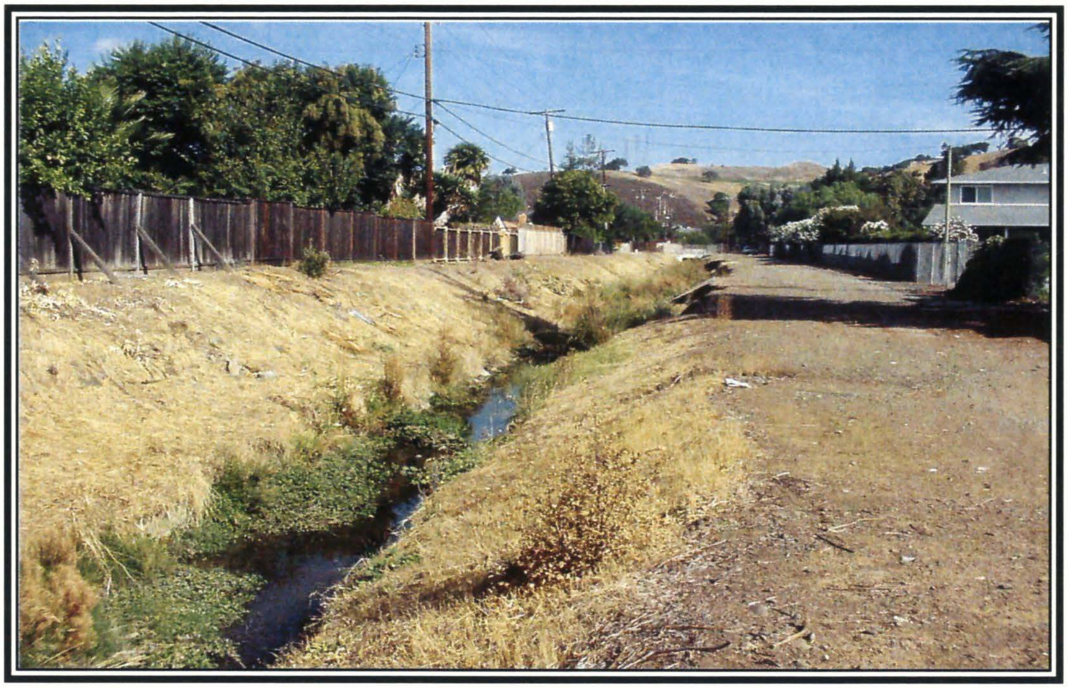


Figure 4. Greystone Creek General Reference Site (STA 11+00-13+10). View looking downstream towards Camden Ave. September 2001.

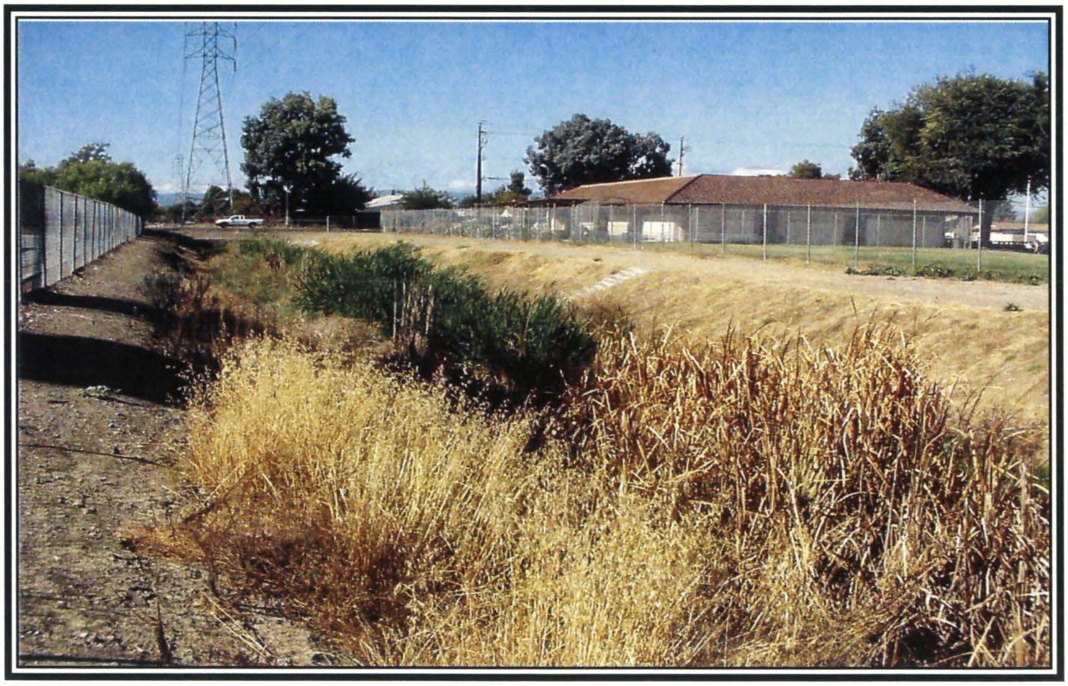


Figure 5. Lower Silver Creek General Reference Site (STA 373+95-375+00). View upstream. September 2001. Note cattail regrowth in background.

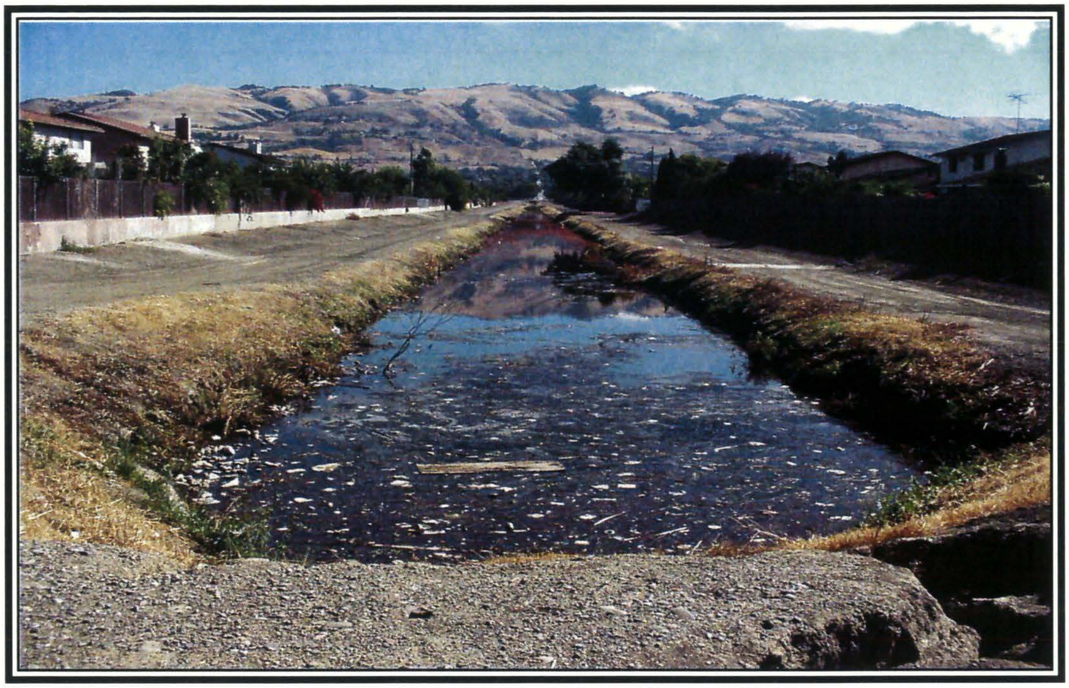


Figure 6. Norwood Creek General Reference Site (STA 7+80-11+00). From confluence of Norwood and Lower Silver Creek looking upstream towards reference site. A very thin fringe of wetland was present along the bank margins.

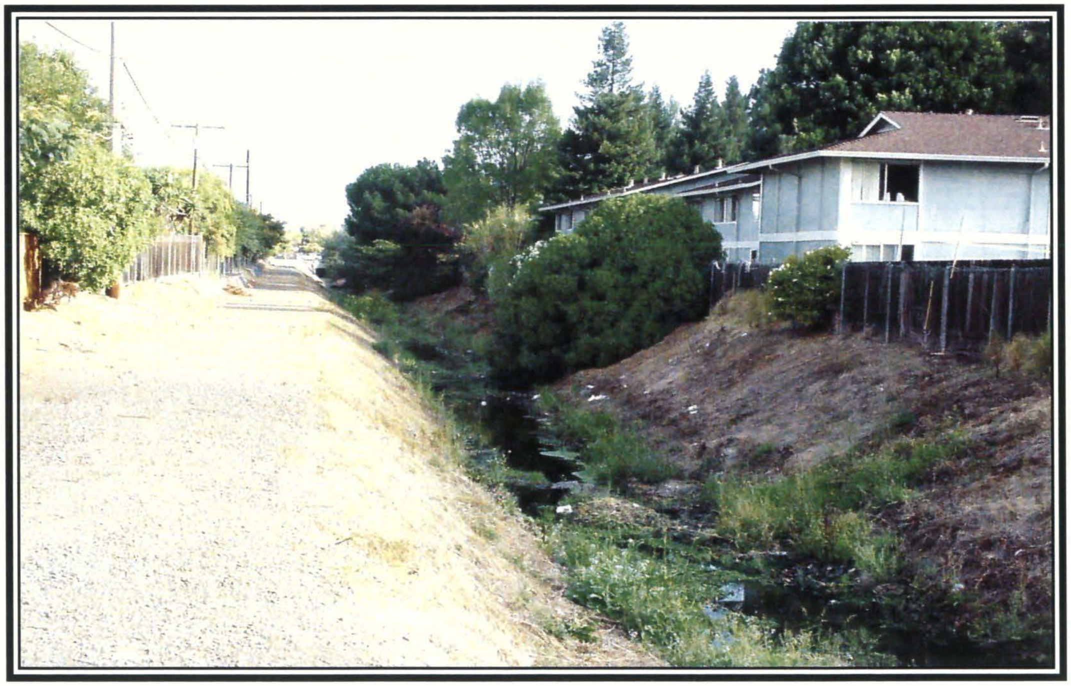


Figure 7. Smith Creek General Reference Site (STA 8+80-10+00). September 2001.

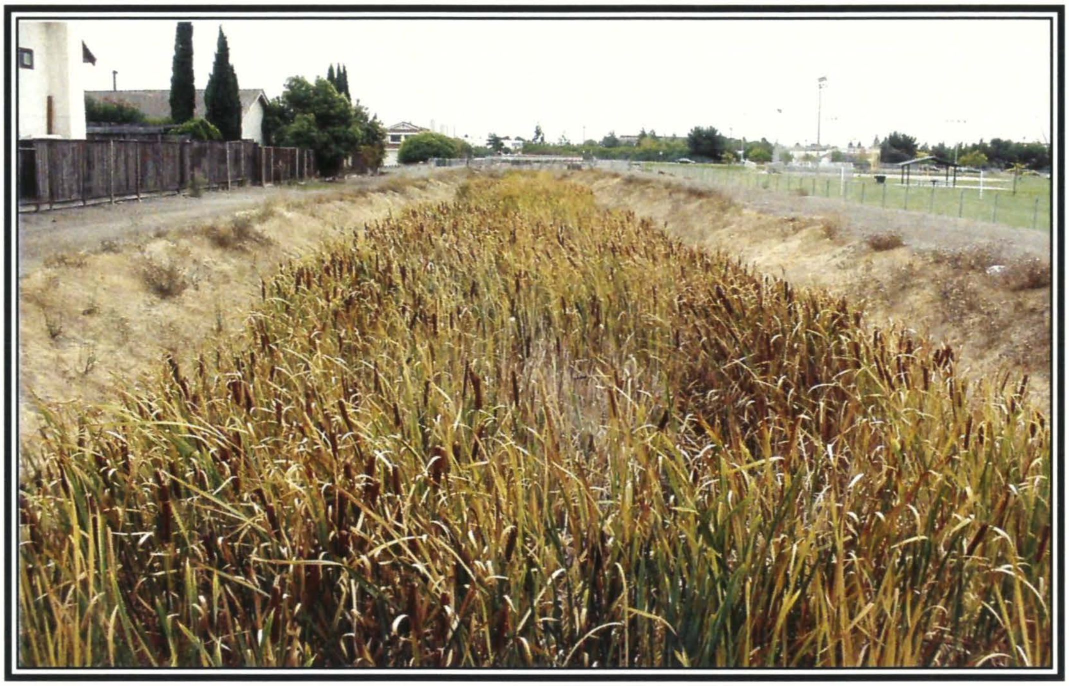


Figure 8a. View looking downstream from Pacheco Dr. footbridge.

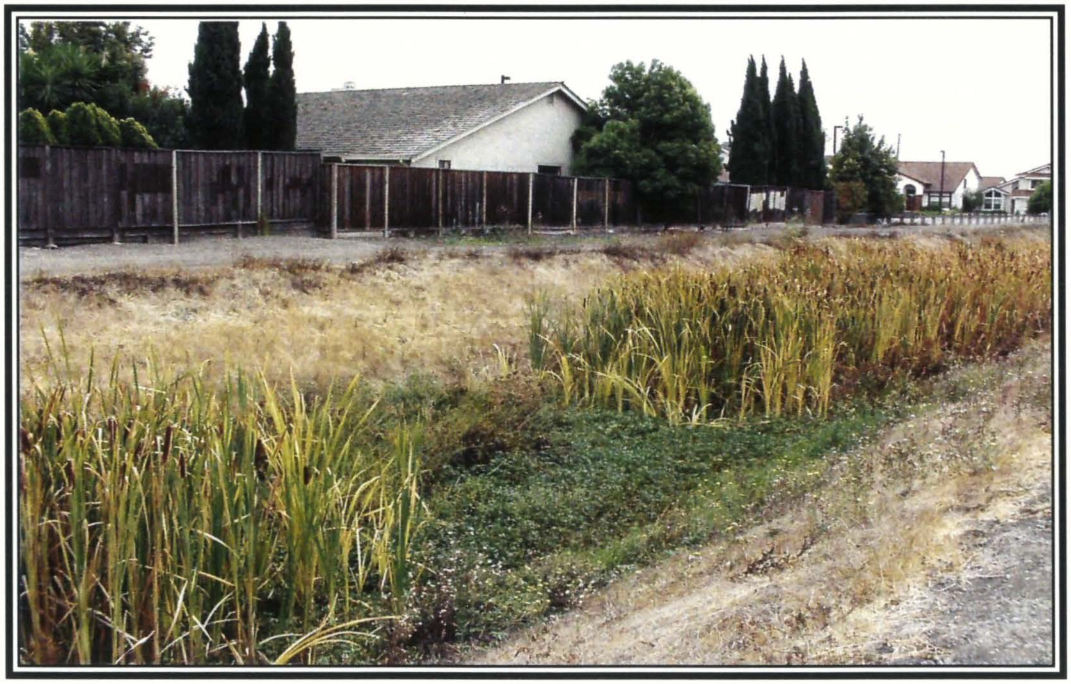


Figure 8b. View looking farther downstream over two habitat types: cattails (tall plants) and water primrose (low-growing).

Figure 8. Tularcitos General Reference Site (STA 9+00-12+80). October 2001.

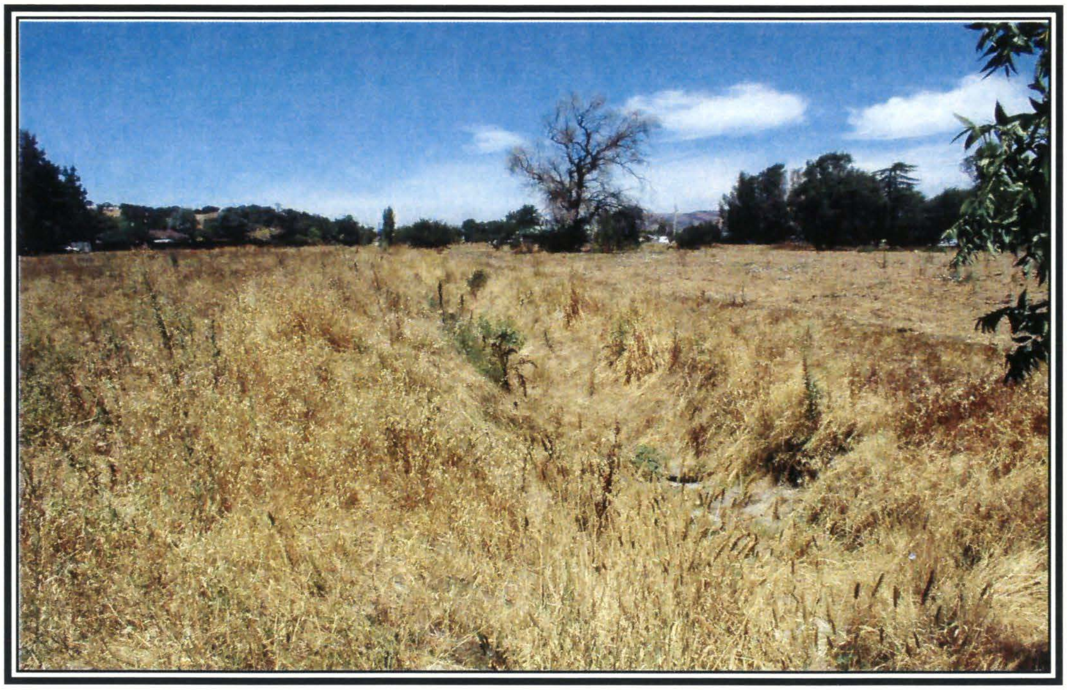


Figure 9a. View upstream from mid-site.

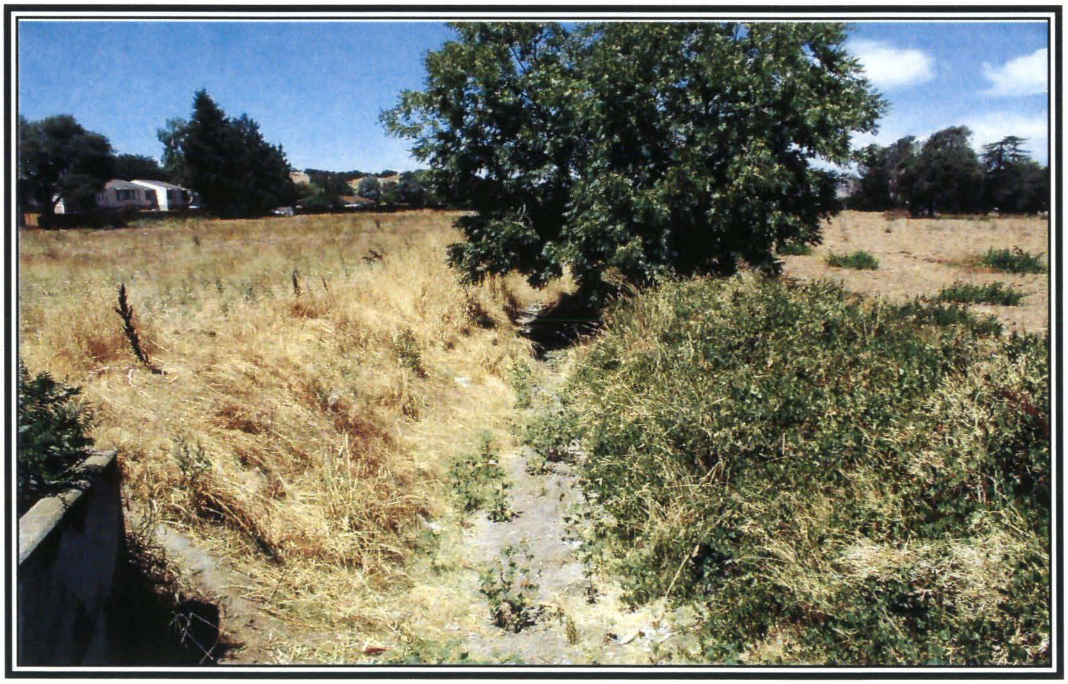


Figure 9b. View upstream from downstream end of site at Cosmo Ave.

Figure 9. West Little Llagas Creek upstream Cosmo Ave. General Reference Site (STA 100+00-101+00). August 2001.

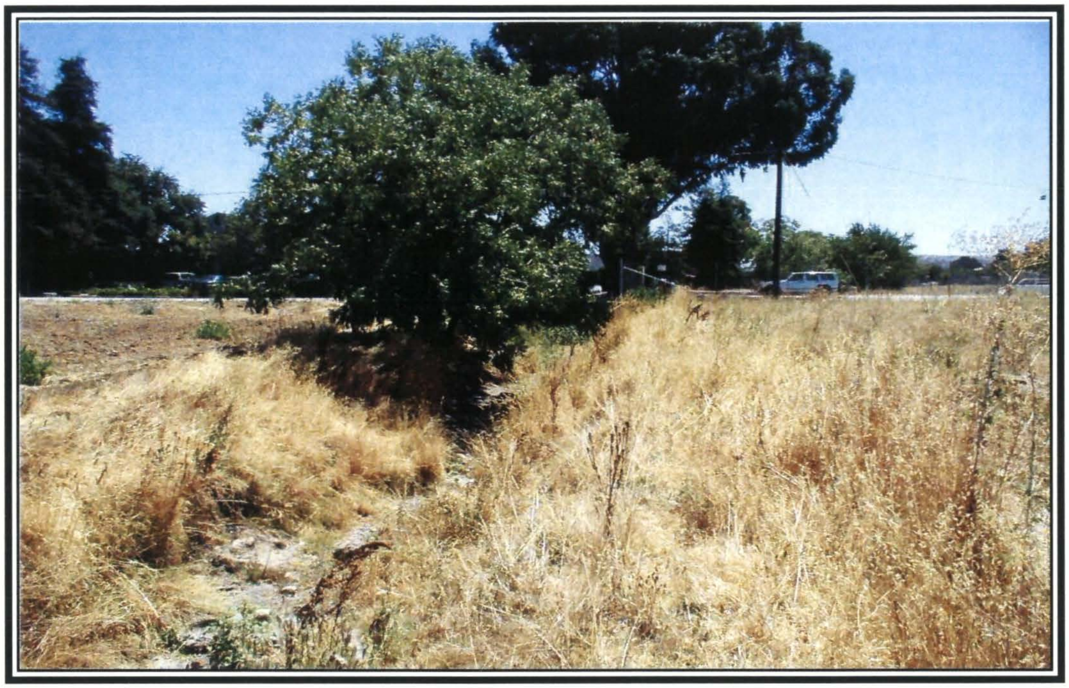


Figure 9c. View looking downstream toward Cosmo Ave. from upstream end of sample site.

Figure 9. Continued.

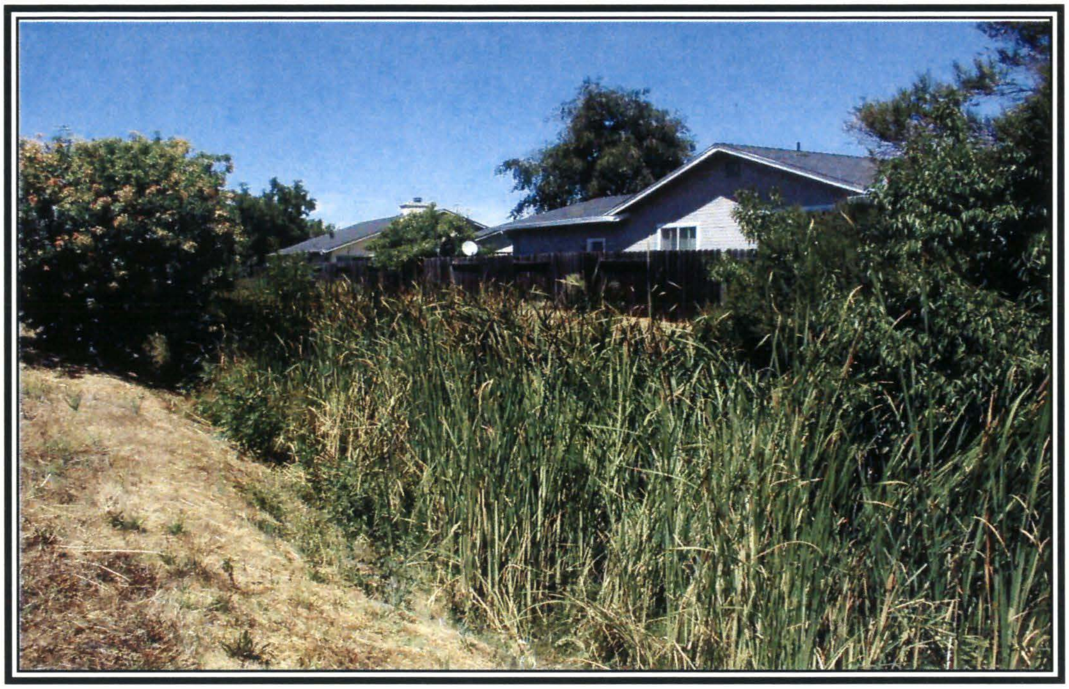


Figure 10. West Little Llagas downstream Main Ave. General Reference Site (STA 152+00-152+80). August 2001.

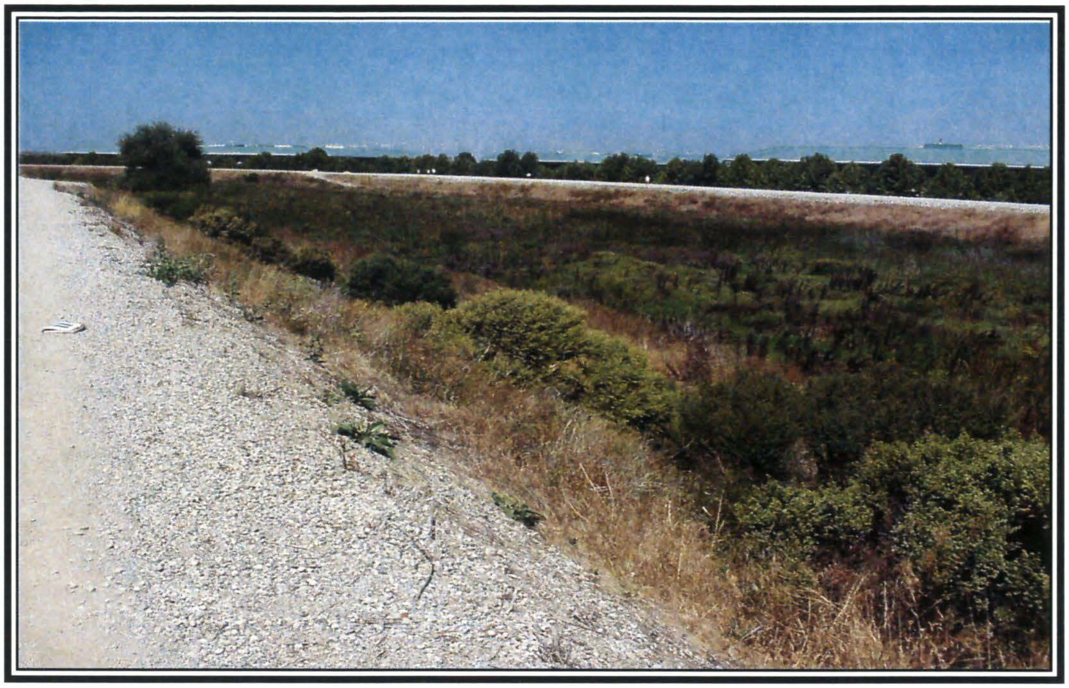


Figure 11a. View over site from right bank looking downstream.

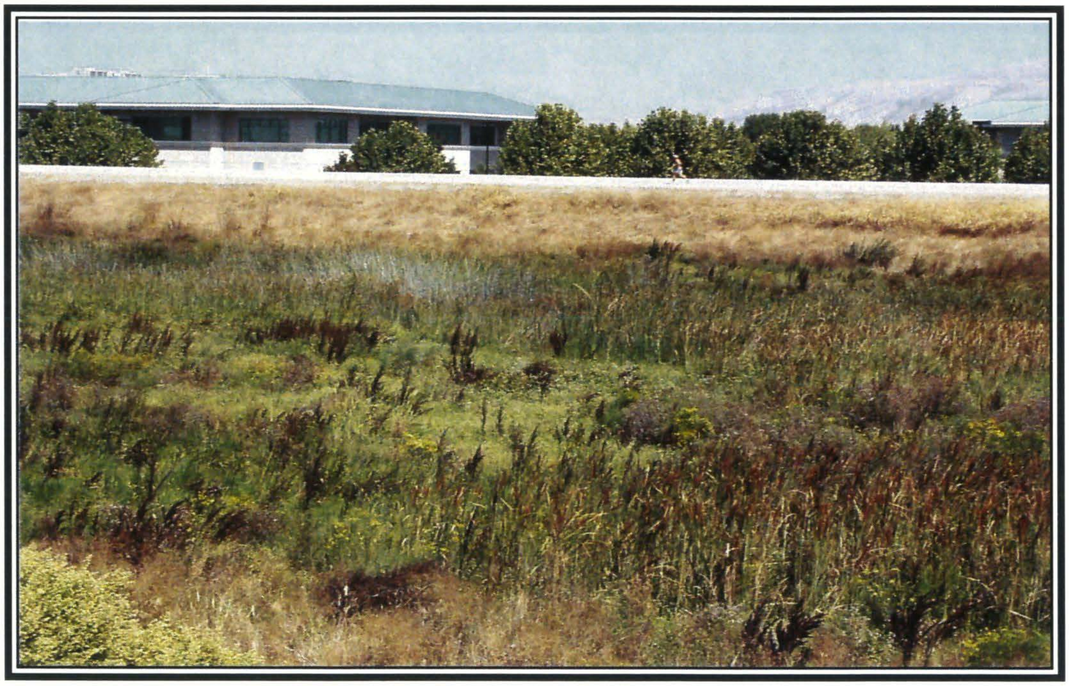


Figure 11b. View across site from right bank. Most of the foreground vegetation is water smartweed (**Polygonum punctatum**), while bulrush and cattail line the low flow channel in the background.

Figure 11. Guadalupe River General Reference Site (STA 318+00-325+50). September 2001.

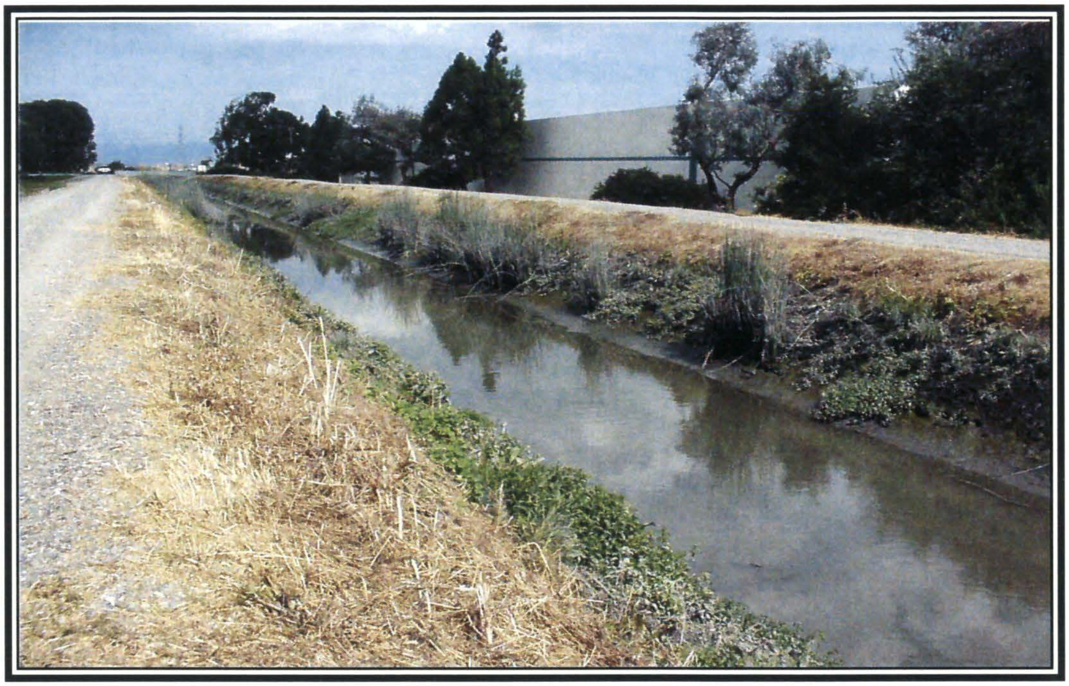


Figure 12. Sunnyvale West General Reference Site (STA 58+00-62+40). View downstream towards Caribbean Ave. September 2001.

APPENDIX G
Recent Excavation History of Study Sites

Appendix G. Most Recent Excavation of Study Sites

STREAM	HALF CHANNEL EXCAVATION[1]	DATE OF LAST SEDIMENT REMOVAL PROJECT[2]
EXCAVATION STUDY SITES		
1997		
Jones		No Maintenance Record[3]
Lower Penitencia	X	1990
Los Coches		1991
North Morey		No Maintenance Record[4]
South Morey		No Maintenance Record[4]
San Tomas (tidal) u/s Highway 237	X	1991
San Tomas (nontidal) u/s of Central Expressway		1991
Saratoga		1993
1998		
Berryessa u/s Lower Penitencia	X	1989, 1991, 1993
Berryessa u/s Montague Expressway		1984, 1987
San Tomas (tidal) u/s Great America Parkway	X	1988
Sunnyvale East		1986
ADJACENT REFERENCE SITES		
Berryessa d/s Los Coches Avenue		1984, 1989
Jones		No Maintenance Record[3]
Lower Penitencia	X	1990
Lions		No Maintenance Record[4]
South Morey		No Maintenance Record[4]
San Tomas (tidal) d/s Highway 237	X	1988
Saratoga		1988
Berryessa d/s Montague Expressway		1988
San Tomas (tidal) u/s Great America Parkway	X	1988
Sunnyvale East		1986
GENERAL REFERENCE SITES		
Nontidal		
Berryessa u/s Los Coches Avenue		1988
East Little Llagas		No Maintenance Record[5]
Fisher		1986
Greystone		1988
Tularcitos		1984
Lower Silver		1982
Norwood		1986
Smith		1986
West Little Llagas u/s Cosmo Avenue		1988
West Little Llagas d/s Main Avenue		1984
Tidal		
Guadalupe River	X	1990
San Francisquito		1993
Stevens	X	1986
Sunnyvale West		1981

---

[1] Per CDFG MOU on these sites, only one side of the channel can be excavated in any one year.

[2] Some sediment removal projects only affected a portion of the total site.
In these cases, all the most recent projects which collectively include the entire length of the site are listed.

[3] Maintained farmers ditch, no construction date

[4] Built in 1988 by NRCS

[5] Built 20-30 Years Ago by State Highway Department

APPENDIX H
Routine Vegetation Management on Study Sites

Appendix H Routine Vegetation Management on Study Sites

Study Site	Planned Routine Vegetation Control Activity	Planned Routine schedule	Work done since 1997
1997 EXCAVATION STUDY SITES			
Jones	NO WORK	no work	same as planned
Lower Penitencia	AQUATIC HERBICIDE APPLICATION[1]	annual	same as planned
Los Coches	AQUATIC HERBICIDE APPLICATION	annual	same as planned
North Morey Channel	WOODY/AQUATIC VEG. REM. HAND LABOR-INSTREAM[2]	annual	same as planned
South Morey Channel	WOODY/AQUATIC VEG. REM. HAND LABOR-INSTREAM	annual	same as planned
San Tomas Aquino u/s Hwy. 237	AQUATIC HERBICIDE APPLICATION - WOODY ONLY[3]	annual	same as planned
San Tomas Aquino u/s Central Expwy	AQUATIC HERBICIDE APPLICATION - WOODY ONLY	annual	same as planned
Saratoga	AQUATIC HERBICIDE APPLICATION - WOODY ONLY	annual	cattails sprayed in 1999
1998 EXCAVATION STUDY SITES			
Berryessa u/s Lower Penitencia	AQUATIC HERBICIDE APPLICATION	annual	annual
Berryessa u/s Montague Expwy	AQUATIC HERBICIDE APPLICATION	annual	same as planned
San Tomas Aquino u/s G. America Pkwy	AQUATIC HERBICIDE APPLICATION -WOODY ONLY[3]	annual	same as planned
Sunnyvale East	AQUATIC HERBICIDE APPLICATION	annual	same as planned
ADJACENT REFERENCE SITES			
Berryessa d/s Los Coches Ave.	AQUATIC HERBICIDE APPLICATION	annual	same as planned
Jones	NO WORK	no work	same as planned
Lower Penitencia	AQUATIC HERBICIDE APPLICATION[1]	annual	same as planned
Lions	WOODY/AQUATIC VEG. REM. HAND LABOR-INSTREAM	annual	same as planned
South Morey	WOODY/AQUATIC VEG. REM. HAND LABOR-INSTREAM	annual	same as planned
San Tomas d/s Hwy 237	NO WORK	no work	same as planned
Saratoga	AQUATIC HERBICIDE APPLICATION -WOODY ONLY	annual	same as planned
Berryessa d/s Montague Expwy	AQUATIC HERBICIDE APPLICATION	annual	same as planned
San Tomas Aquino u/s Great America Pkwy	AQUATIC HERBICIDE APPLICATION -WOODY ONLY[3]	annual	same as planned
Sunnyvale East	AQUATIC HERBICIDE APPLICATION	annual	same as planned

Appendix H. Continued.

Study Site	Planned Routine Vegetation Control Activity	Planned Routine schedule	Work done since 1997
GENERAL REFERENCE SITES			
Nontidal Sites			
Berryessa	AQUATIC HERBICIDE APPLICATION	annual	same as planned
East Little Llagas	NO WORK	no work	same as planned
Fisher	WOODY/AQUATIC VEG. REM. HAND LABOR-INSTREAM	not performed recently	no work
Greystone	AQUATIC HERBICIDE APPLICATION	annual	same as planned
Tularcitos	AQUATIC HERBICIDE APPLICATION	annual	same as planned
Lower Silver	AQUATIC HERBICIDE APPLICATION	annual	same as planned
Norwood	AQUATIC HERBICIDE APPLICATION	annual	same as planned
Smith	AQUATIC HERBICIDE APPLICATION	annual	same as planned
West Little Llagas u/s Cosmo St.	WOODY/AQUATIC VEG. REM. HAND LABOR-INSTREAM	annual	same as planned
West Little Llagas d/s Main St.	WOODY/AQUATIC VEG. REM. HAND LABOR-INSTREAM	annual	same as planned
Tidal Sites			
Guadalupe River	AQUATIC HERIBCIDE APPLICATION-WOODY ONLY	annual	same as planned
San Francisquito	AQUATIC HERIBCIDE APPLICATION-WOODY ONLY	not performed recently	no work
Stevens	AQUATIC HERBICIDE APPLICATION	annual	same as planned
Sunnyvale West	AQUATIC HERBICIDE APPLICATION	annual	same as planned

1 - Aquatic herbicide application includes both herbaceous and woody plants

2 - Sites receiving "aquatic heribicide - woody only" treatment also have woody vegetation hand removal every two years

3 - On this site includes only removal of non-natives such as pampas grass and woody non-natives